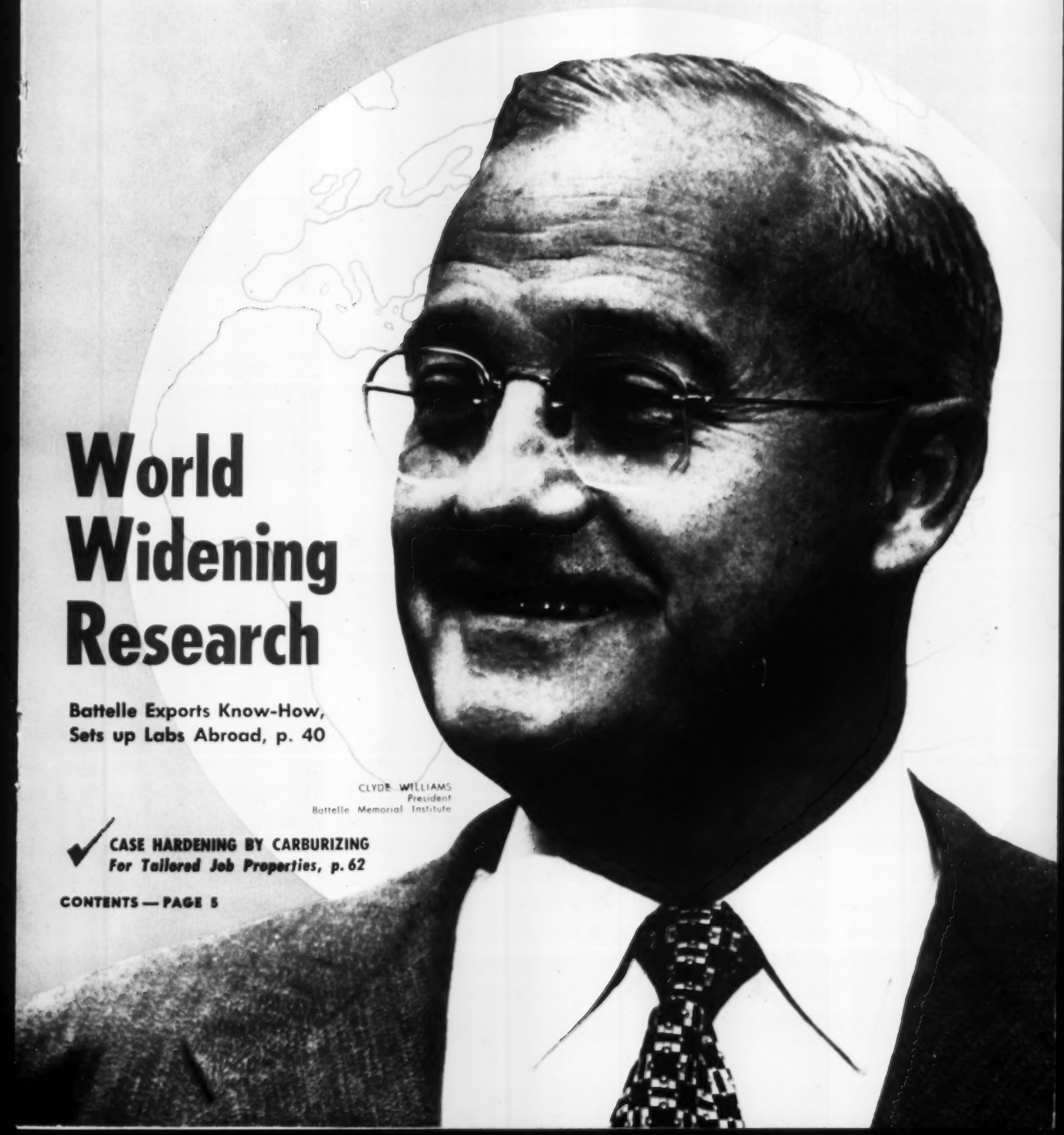
JULY 5, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

World Widening Research

Battelle Exports Know-How, Sets up Labs Abroad, p. 40



CLYDE WILLIAMS
President
Battelle Memorial Institute

✓ **CASE HARDENING BY CARBURIZING**
For Tailored Job Properties, p. 62

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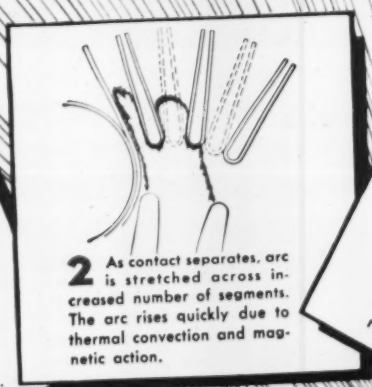
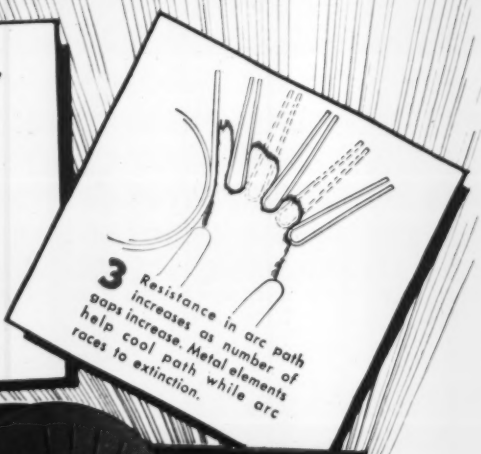
Quick Quenching
EXTENDS CONTACT LIFE!

1 Arc, forced upward along runner by magnetic field of blowout coil, impinges upon metal segments of arc chute.



2 As contact separates, arc is stretched across increased number of segments. The arc rises quickly due to thermal convection and magnetic action.



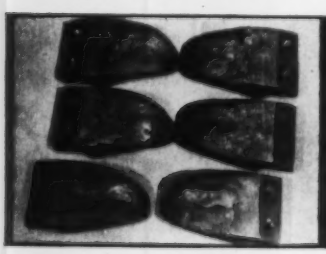
3 Resistance in arc path increases as number of gaps increase. Metal elements help cool path while arc races to extinction.

Because arc is extinguished quickly, destructive burning and pitting of contacts is minimized.

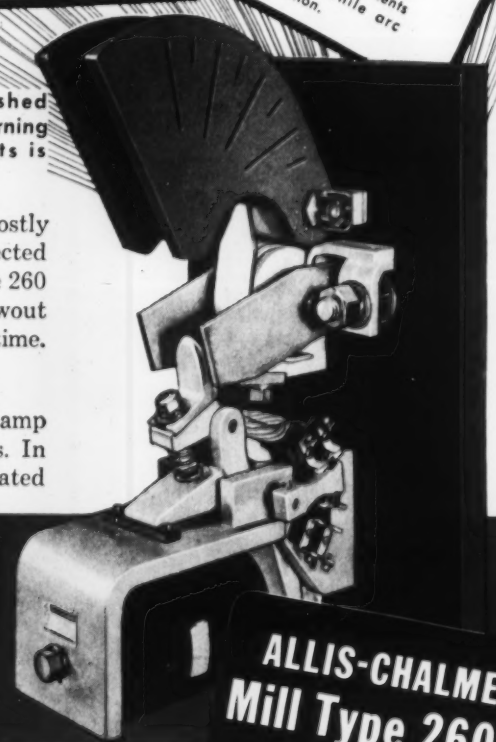
CONTACT BURNING is the most troublesome and costly maintenance factor in an interrupting device subjected to repeated overloads. In the Allis-Chalmers Type 260 contactor a quick-quenching arc centering blowout solves the problem by sharply curtailing arcing time.

No Contact Erosion After Punishing Tests

Pictured below are contacts removed from a 600-amp experimental starter after extreme overload tests. In addition to great number of interruptions at rated current and below, these tests included 70 interruptions spread between 700 and 11,000 amperes and two interruptions above 13,000 amperes. All testing was done with the same set of contacts.



CONTACTS AFTER HIGH INTERRUPTION TESTS



ALLIS-CHALMERS Mill Type 260 DC CONTACTOR

A-4334

For complete information on heavy duty dc contactors, call your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

THESE FORGED BLANKS *HELP REDUCE* MACHINING PROBLEMS

Checking a shipment of Bethlehem blanks at a plant of United States Rubber Company. Other photos show various stages in the machining of tire molds.

Steel with good grain flow, homogeneity, and uniform density can be machined with confidence. These characteristics are always present in Bethlehem's forged-and-rolled circular blanks, and they are one reason why this type of blank is so excellent for many applications.

Boiled down, reports from machine shops indicate the following:

When Bethlehem blanks are used, cutting speed is frequently higher, and fewer finishing cuts are required in many cases. Uniform finish allowance on OD, bore, and faces further contributes to speed and ease of machining. Moreover, the soundness of these blanks is an outstanding advantage.

These strong steel blanks are ideal for gears, crane and sheave wheels, tire molds, flywheels, and a host of other circular parts. They are available untreated or heat-treated in sizes from 10 to 42 in. OD. Why not ask for full details?

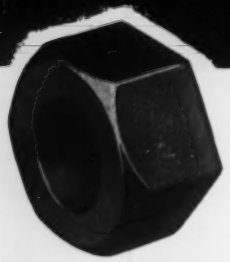
BETHLEHEM
Forged-and-Rolled
CIRCULAR FORGINGS

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

4200 Nut Blanks Per Hour

Feed rolls push barstock through TOCCO Induction Coils to heat stock to 2350°F for forging.



with TOCCO* Induction Heating

FASTER PRODUCTION—4200 nut blanks per hour—twice the output of a conventional hot punching machine—that's the result of Lamson & Sessions Company's new automatic production set up with TOCCO Induction Heating.

OTHER ADVANTAGES—TOCCO delivers exact temperatures (2350°F, plus or minus 25°) and delivers them so fast that scale has little time to form. Scale loss has been reduced to only about 1% for hot-rolled stock. TOCCO is clean and cool, fits right into the production line—no hauling to and from the heat-treat department—no unpleasant radiant heat to annoy workers.

HERE'S HOW IT WORKS—Steel bars up to 1½" diameter are fed through TOCCO Induction Coils. The first two coils, operating off a 300 kw, three kc TOCCO motor-generator set, preheat the rod. The third coil which operates from a TOCCO 250 kw 10 kc generator then boosts the rod to forging temperature. The hot rod then is fed to the special hot nut former (designed and built by NATIONAL MACHINERY CO.) which shears the rod to suitable lengths, forms the part and spits out the nut blank—ready for tapping.

In your search to find sound methods of increasing production, improving products and lowering costs, don't overlook TOCCO Induction Heating. If your products require heat treating, soldering, brazing or forging, it will pay you to investigate TOCCO for better, faster ways of producing them at lower unit costs.

THE OHIO CRANKSHAFT COMPANY

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Mail Coupon Today

FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-7, Cleveland 1, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forging."

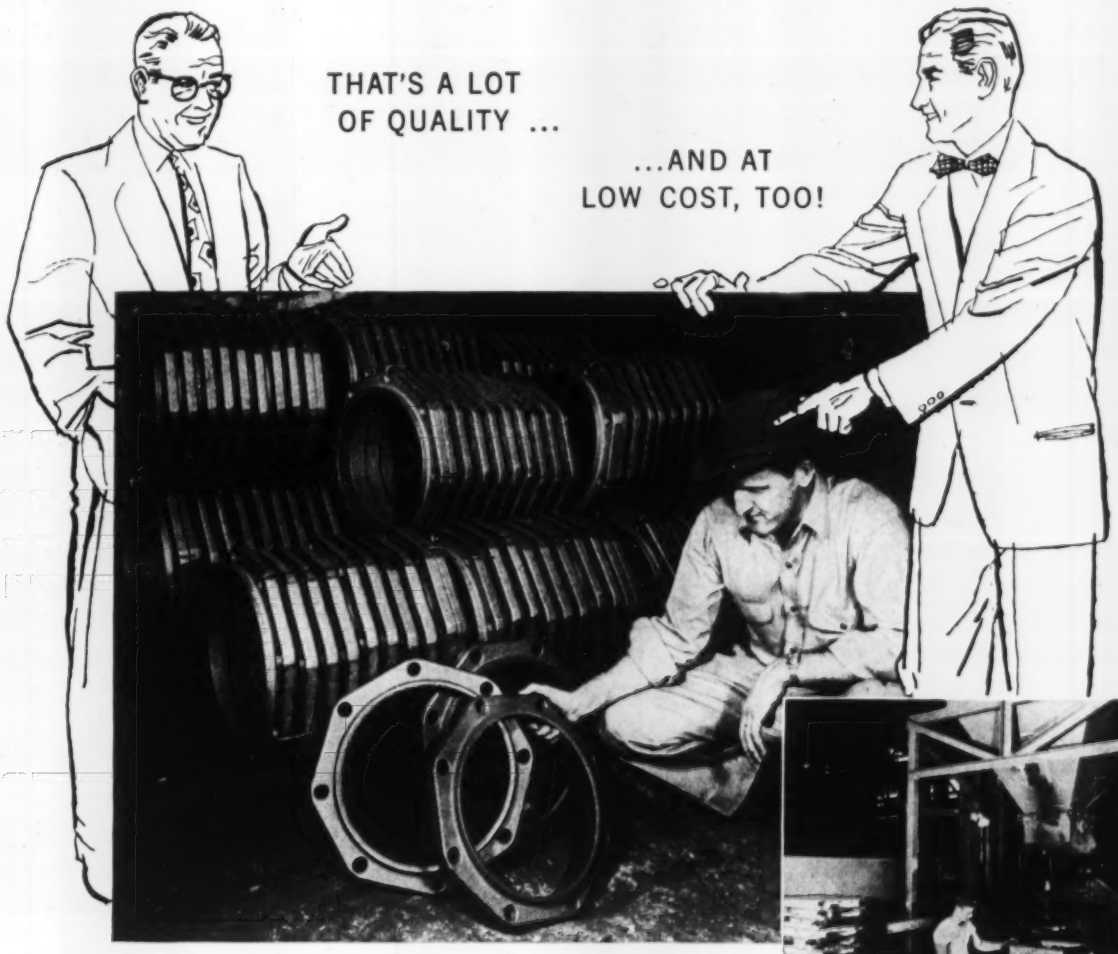
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State____



With only ONE operator...ONE Osborn Rota-Lift now turns out as many molds as TWO molders used to!

Another example of Osborn leadership and advanced engineering

HERE, 160 top-quality molds are turned out daily by only *one* operator (it used to take *two*!) using the Osborn Rota-Lift. Moreover, molds are uniform in density, have high dimensional accuracy for pressure-tight pipe joint castings. *Cost per mold is less than heretofore possible.*

Osborn Rota-Lift produces more perfect molds per manhour because it eliminates heavy manual effort, cuts fatigue, makes production more uniform to maintain foundry schedules, day in, day out.

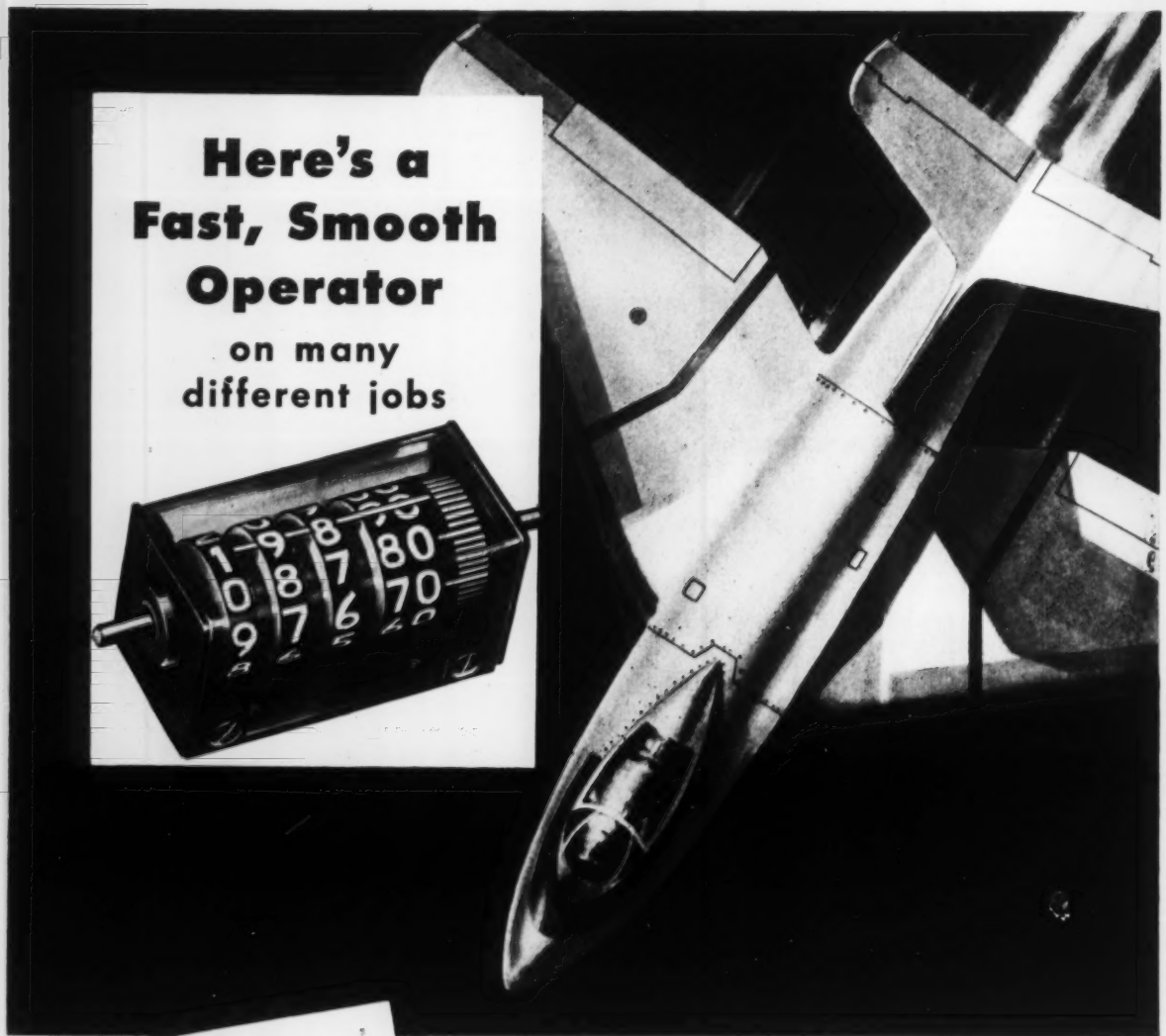
LOOK TO OSBORN FOR WAYS TO CUT COSTS. Have your Osborn representative study your molding jobs, to show you how to simplify jobs . . . cut down costly operations. Write The Osborn Manufacturing Company, Dept. EE-20, 5401 Hamilton Avenue, Cleveland 14, Ohio.

OSBORN

MOLDING MACHINES CORE BLOWERS

Here's a Fast, Smooth Operator

on many different jobs

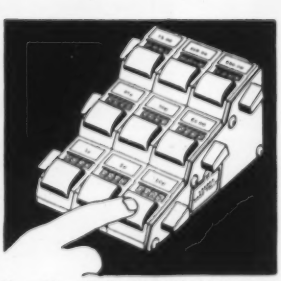


Added Evidence that...

Everyone Can Count on VEEDER-ROOT

This new, high-speed direct-drive counter . . . with its one-piece "show window" case . . . was first developed for use in navigational and directional instruments. Then, because of its many adaptable features, it is eligible for employment in many other jobs. It's good for speeds up to 1800 rpm . . . temperatures from 67° to 185° F . . . and it's corrosion resistant. Drive shafts can be longer on either side or both. And base may be lengthened to take more figure-wheels if you want. All in all, a remarkably versatile performer . . . one of scores of standard and special Veeder-Root Counters for every mechanical and electrical application from Electronics to Automation. Write:

VEEDER-ROOT INCORPORATED • HARTFORD 2, CONNECTICUT



New *Vary-Tally* Multiple-Unit Reset Counter comes in any combination up to 6 banks high, and 12 units wide. Write for news sheet and prices.

Chicago 6, Ill. • New York 19, N. Y. • Greenville, S. C. • Montreal 2, Canada
Dundee, Scotland • Offices and Agents in Principal Cities

"The Name that Counts"

This Week in Metalworking

STEEL

Vol. 135 No. 1 July 5, 1954

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Brilliant finish and outstanding corrosion protection on cadmium.

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Luster-on Cobra
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Luster-on finishes, used by many of the country's largest metal finishers, have established themselves over ten years as a dependable, low-cost treatment for thousands of metal items. Data sheets and technical service are available without cost or obligation.

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L-12

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PLATINUM COUPLES
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behind the scenes

Growing All the Time

Even economists who speak glibly in billions are awed by the size, power and influence of the gigantic metalworking industry. Its complexity, its great volume of soup-to-nuts products are not easy to visualize.

Do you know that in the minute it takes you to read this item, metalworking will produce another $250,000 worth of its goods?

Since all concepts of size are relative, measuring the industry by known facts—like employment—will help little ole us draw a clearer picture for you. Metalworking now employs almost 8 million workers. That's slightly less than half of all workers in all industry. Now, when we consider that metalworking's total employment was less than 4 million in 1943, this one yardstick alone provides an impressive measure of dramatic growth.

Growth means change and change is continual in this remarkable industry of which you are a vital, active part. If you make a product which you sell to metalworking, you'll want to keep tab on this Topsy-like industry. For, as she grows, so grow your opportunities for greater sales . . . for greater profits.

At Limbo

Doing nothing is the most tiresome job in the world . . . you can't quit and rest. Well, we're in one of those particularly "tiresome" moods right now. So please bear with us while we work off our thumb-twirling lapse by rambling about things and stuff.

. . . An innocent question brought the answer just this morning that the iron and steel industry spent over $1 billion in 1953 to expand and improve its plants. This large expenditure, the third largest in the industry's history, was invested by large and small producer alike. Approximately $775 million is being earmarked for new facilities in 1954.

. . . Dr. Allen Gray, STEEL technical editor, has been wowing the engineering fraternity on the banquet circuit again. His most recent star performance was at the 42nd Annual Educational Session of the American Electroplaters' Society in Chicago.

Doc Gray talked on the subject "What's Ahead in Plating?" and did such an outstanding job that he had to promise to do a repeat performance sometime soon.

His address was later printed in its entirety in the June issue of "Products Finishing" magazine.

. . . We're beating our chest with Krupa-like ferocity today because one of our great family of readers thinks we're clever. That's what the man said, you bet.

"The clever cartoons and cutlines in your May 31 'Behind the Scenes' struck my fancy", says Win Riemer, public and human relations manager of the Brillion Iron Works, Inc.

"May we have your permission to reprint in whole, or in part, the material in this feature?"

Yes, Mr. Riemer, we modestly grant you permission to reprint as much of that bit as you like. Feel free to improve on it in any way at all.

Prices vs Value

In our reading one day last week we happened across an item which discussed salesmanship. It described salesmanship as the art of building *value* until it is greater than *price* in the customer's mind.

Value is what the customer *gets*. *Price* is what the customer *gives*.

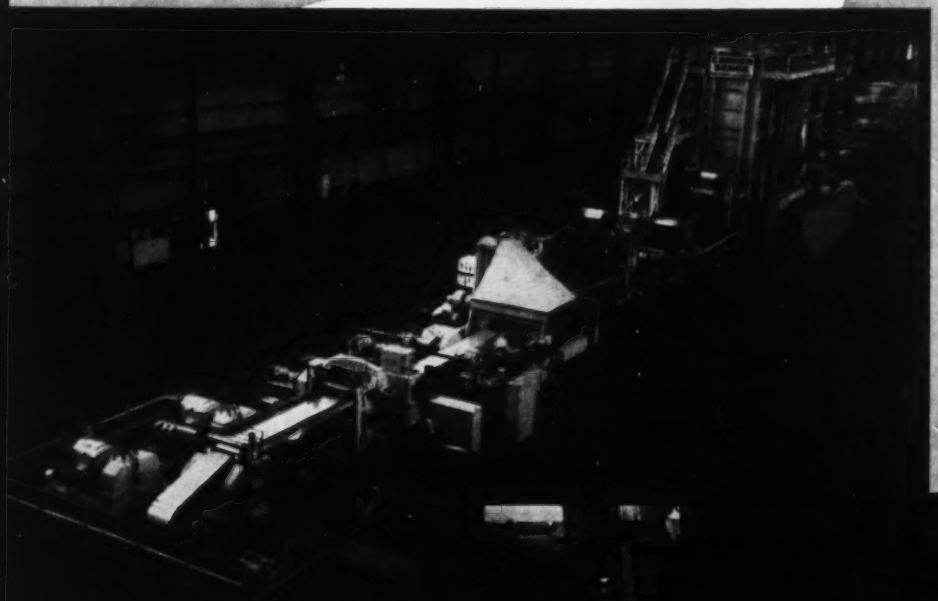
You can well understand that the extent to which the salesman builds value in the customer's mind—the degree to which he makes the customer want the merchandise more than the money it cost—will determine his importance: to the customer, to his organization and to himself.

This is certainly not an original thought to most of you who are out on the sales firing line, but we thought is was an interesting one particularly during these times of hardsell.

Shrdlu

(Metalworking Outlook—Page 21)

WEAN GALVANIZING LINES



WEAN Galvanizing Lines are designed and manufactured to produce prime zinc coated strip in coil or cut-to-length sheet specifications.

FEATURES:

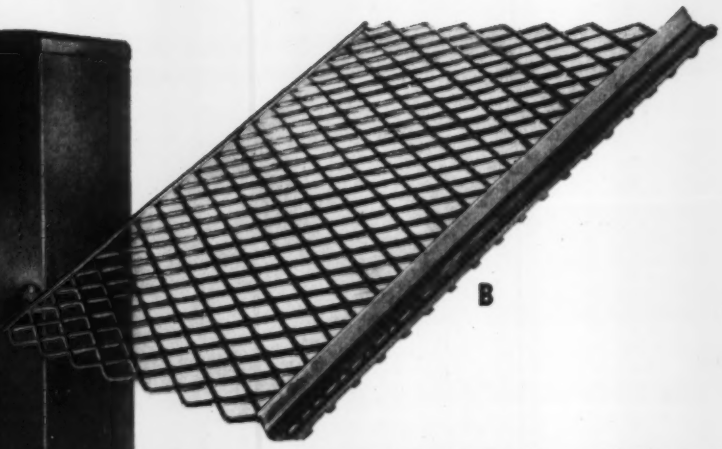
1—Correct engineering design
2—High operating speed
3—Continuous annealing
4—Uniformity of coating

Specialists
IN SHEET, TIN and STRIP MILL EQUIPMENT

The WEAN ENGINEERING CO., Inc.
WARREN, OHIO

Why EXPANDED METAL is preferred for laboratory equipment SHELVING

A

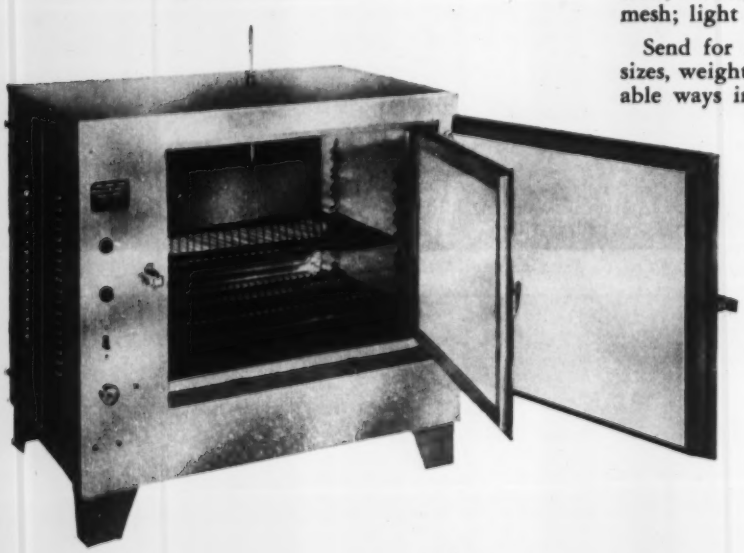


B

A "Precision-Thelco" incubator with doors opened, showing expanded metal shelves. A product of Precision Scientific Company, Chicago, Ill.

B Expanded metal shelf with bracket attached for use in a "Precision-Thelco" economy incubator.

C Blue M counter flow combination temperature and humidity cabinet with expanded stainless steel shelves. Manufactured by Blue M Electric Company, Chicago, Ill.



There are six reasons why Penmetal expanded metal is used for the shelves in these laboratory cabinets:

because it provides strong and rigid support for specimens or instruments.

because it is light in weight, easy to handle and clean.

because it permits free circulation of air.

because it has that smart, clean, attractive appearance that typifies modern trends in design.

because it is low in cost.

because it is available in stainless steel to match the construction of the cabinets.

Penmetal expanded metal is sheet metal that has been slit and expanded to as much as ten times its original width. Up to 80% lighter than solid sheet of the same dimensions, the diamond truss pattern adds rigidity and strength. Available in carbon steel, aluminum, stainless steel, Monel, Inconel, and other metals; large or small mesh; light or heavy gauge.

Send for *NEW* 28-page catalog which gives mesh sizes, weights and dimensions, and shows many profitable ways in which you can use Penmetal expanded metal. No cost or obligation.

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Penmetal

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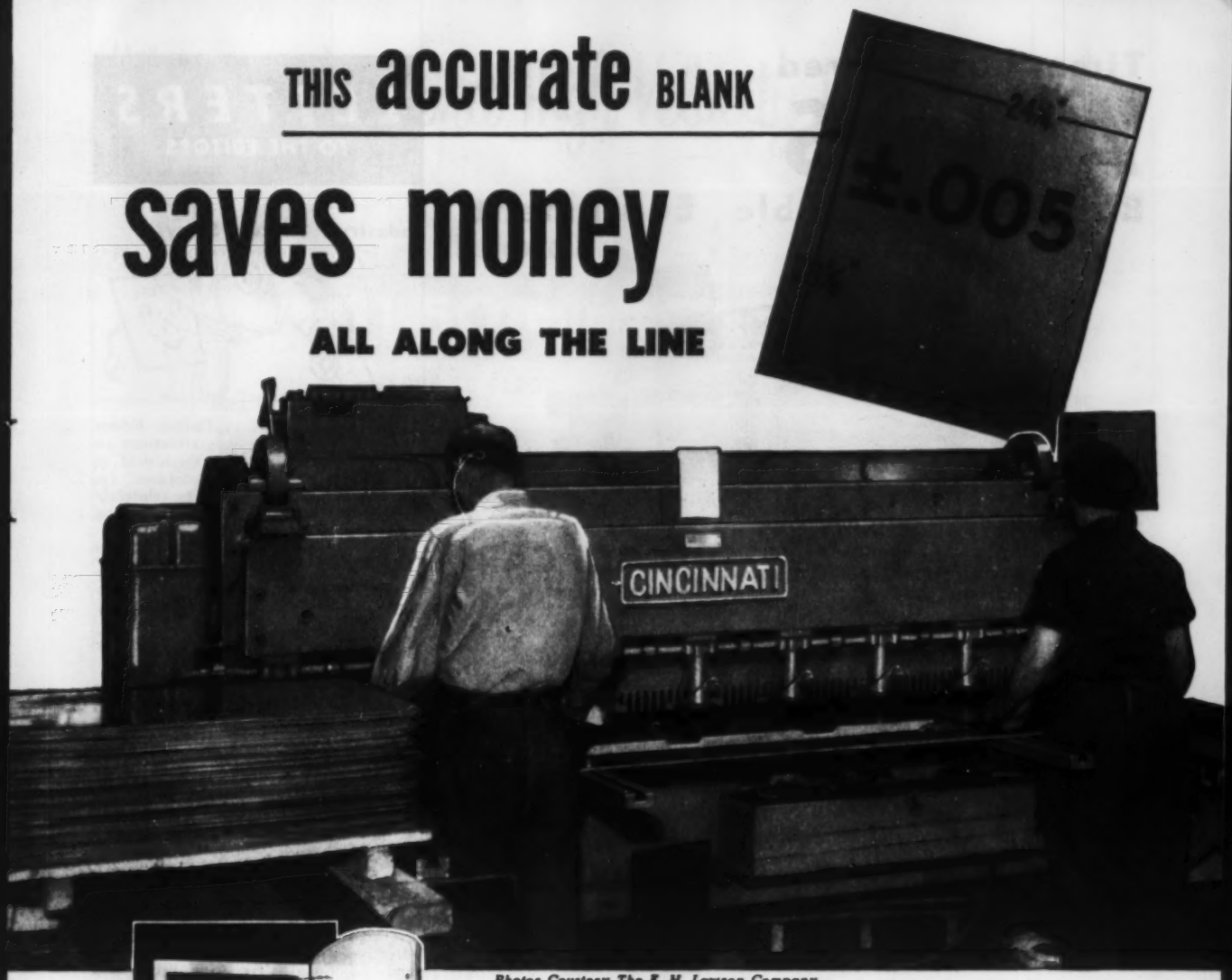
PM-33

THIS accurate BLANK

saves money

ALL ALONG THE LINE



These accurate blanks are held to tolerances of ± .005" on Cincinnati Shears in the shops of The F. H. Lawson Company, manufacturers of medicine cabinets, pails and all sorts of containers.

Photos Courtesy The F. H. Lawson Company

In lots of 10,000 at 400 an hour these 24½" x 28⅝", 26 gauge blanks are produced with such accuracy that production costs all along the line are low. One and one-half to two million cuts are made before knives need regrinding . . . another important factor in the low cost. Rejects and reworks are very few. Only accurate blanks bring low cost forming and assembly.

Write for Catalog S-6.

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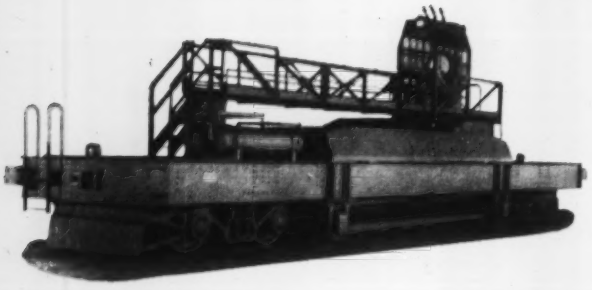
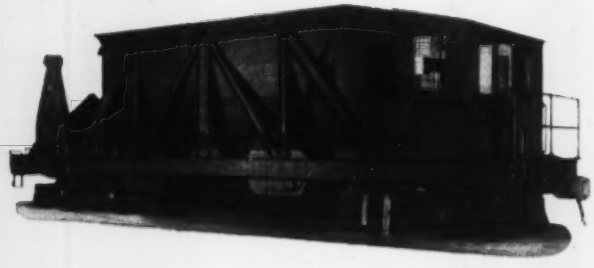


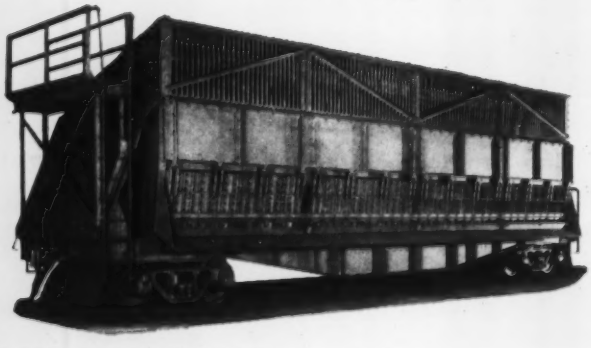
30 Ton Double Hopper Bottom Scale Charging Car. Operator's platform is above hopper to facilitate bin operation.

SCALE CARS



ORE TRANSFERS

60 Ton Center Bottom Dump Ore Transfer Car. Equipped with pneumatically operated balanced type pusher arm.



Coke Quenching Car. Motor-operated cast steel discharge gates. Bottom, ends and front are abrasive resistant steel plate.

COKE QUENCHERS

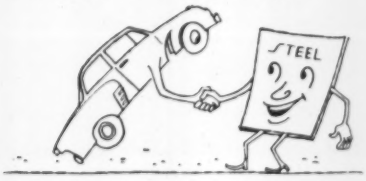
THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Industry's Stickum Story



Will you pass on to Detroit Editor Floyd Lawrence my congratulations on his very good article on Cycleweld in the May 24 "Mirrors of Motordom" (p. 69). He handled what must be relatively unfamiliar material with understanding and intelligence.

Cord Lipe
sales manager
Cycleweld Cement Products Division
Chrysler Corp.
Trenton, Mich.

Plant Tour at Alcoa

Your article, "Ford Tailors Plant Tour to Visitors' Interests" (May 24, p. 61), and your editorial, "Ford Shows the Way" (p. 52), were of extreme interest here. They indicate that, at Alcoa's Cressona Works, we've got a job of horn blowing to do.

On June 20, 1953, we held a Family & Friends Day using precisely the same method of employing guides as was used by Ford for the visit of the American Foundrymen's Society. A total of almost 13,000 visitors toured our plant despite temperatures that rose to the high 90s. The guide plan was most effective. Approximately 900 information and directional signs were used, thus minimizing the need for questioning the guides. An innovation: Where equipment had to be roped off, posts of aluminum irrigation pipe standing in bored extrusion ingots were used.

The fact that one of our metallurgists brought the Ford item to our attention shows that your publication packs a punch in reader interest. Continued success to STEEL, (the publication, of course)!

Paul V. Cullather
Aluminum Co. of America
Cressona, Pa.

What the Seaway Will Mean

I just want to say that I think your series on the St. Lawrence Seaway (May 24, May 31 and June 7) is excellent. Congratulations on a major contribution to a better understanding of the seaway and the changes it is going to effect in the Midwest.

Walter Toerge
Ketchum, MacLeod & Grove Inc.
Pittsburgh

I enjoyed your May 31 article, "The Seaway . . . New Channel for Business," No. 2 in a series of three articles. Outside of supplying electric power, this seaway is being built for the purpose

(Please turn to page 12)

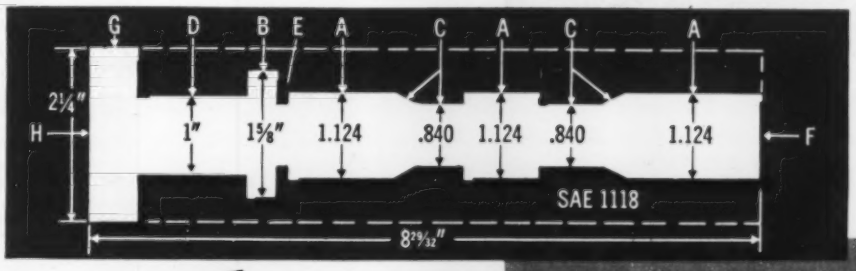
This is the difference High Velocity Turning makes

IN 1947 this job took...

11.50 min.

FLOOR TO FLOOR

A. Turn — 694 RPM — .015" Feed
B. Turn — 489 RPM — .015" Feed
C. } Form — 119 RPM — .0025" Feed
D. }
E. Face, shoulder, neck, undercut, HSS
F. Face 243 RPM — .0035" Feed
G. Knurl
H. Cut off — 243 RPM — .0035" Feed



IN 1954 this same job takes...

5.00 min.

FLOOR TO FLOOR

A. Turn — 1000 RPM — .022" Feed
B. Turn — 1000 RPM — .022" Feed
C. } Form — 340 RPM — .0035" Feed
D. }
E. Face, shoulder, neck, undercut
F. Face 489 RPM — .0035" Feed
G. Knurl
H. Cut off — 489 RPM — .0035" Feed

J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Turning out a job like this in 5 min. calls for a lathe with plenty of power and the beef to back it up . . . a lathe like the Jones & Lamson #7A Universal Turret Lathe, which is specially designed to meet today's demand for more production at lower unit costs.

Only with a lathe like this can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

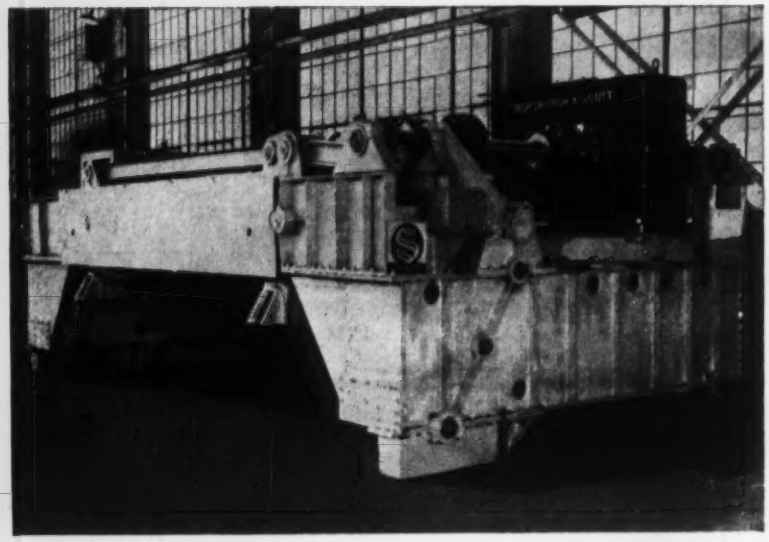
This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L **MACHINE TOOL DIV.**

Giving a lift to 56,000 pounds of



soaking pit cover through . . .

H & S REDUCERS

• The above photograph shows a soaking pit cover crane designed and built by Salem-Brosius, Inc. Two Horsburgh & Scott Helical Speed Reducers are used on each crane...the lift drive handles a cover weighing about 28 tons and operates at a speed of 6′ per minute...the traverse drive moves the crane at a speed of 88′ per minute. Many of these cranes have been operating very satisfactorily for twelve to fifteen years...actual tribute to complete engineering design.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

LETTERS

(Concluded from page 10)

of serving industry. So a few questions are in order:

1. What commodities are expected to move over the seaway?
2. What country's boats will be used?
3. What will the shipping rates be then?
4. If tolls are charged for use of the seaway, what will they be based upon?
5. If tolls are an honest attempt to compensate the U. S. & Canada for money invested, who in the world can afford to operate ships through the seaway?
6. What will the impact of the seaway be on truck and rail transport in view of the freeze-up of the Labrador ore ports for a good part of the year?

William M. Connelly
Sanders, Hamilton, Dobmeier & Connelly
Buffalo

• *Complete answers to some of the pertinent questions you raise must await more finalized planning of this huge project. Here's the current opinion of lake shipping men on a few of the points you raise:*

1. Expectations are that bulk commodities, such as ore and grain, will largely benefit from the seaway. There is hope that package freight may be increased but that remains to be determined.

2. The hope is that American bottoms will be used to a great extent. A move already has been started among shippers to assure that American vessels will be favored.

3. Expectations are the seaway will result in substantial freight cost savings.

4. Tolls are expected to cover the costs of the project. Until the Canadian-American commission charged with working these tolls out gets into action, it will be impossible to determine what they will be.

5. Ore shipments from Minnesota and Michigan are possible for only about eight months of the year now; the winter freeze should present no more of a problem for Labrador ore shippers. It's impossible to determine at this stage what the impact of the seaway will be on rail and truck transportation.—ED.

Difference of 6108.85 Inches

We know that we have built some rather fast furnaces, but you amazed us in the article, "Anneal Furnace Makes Double Play" (June 14, p. 128), with the statement, " . . . average speed (of the furnace) is 6115 inches per minute . . . " According to the original copy of this article, that should have read 6.15 inches per minute.

R. C. Wayne
Surface Combustion Corp.
Toledo, O.

Big Demand in Titanium

We wish to compliment you and C. I. Bradford, Rem-Cru Titanium Inc., on the splendid series of five fine articles on titanium which appeared in the May 10 through June 7 issues of STEEL. We feel that they have partially filled a great demand for information regarding the application and processing of titanium metal.

C. E. Roberts
Alloy Steel Division
Republic Steel Corp.
Massillon, O.

"Let's talk one-piece construction!"

"We're at the crossroads, Bob. We've got to have more heat exchange capacity, yet we can't afford new equipment. What can we do?"

"Well, you've pretty much answered that question yourself. You said you were at the crossroads—I use that expression to describe the point where using Wolverine Trufin* is more economical than prime surface tube. In other words, Mr. Jones, you should retube with Trufin—the integral finned tube."

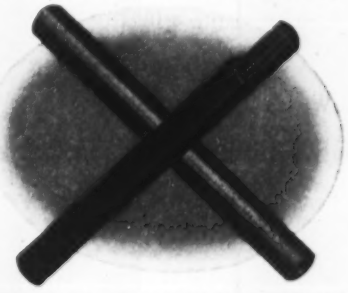
"What exactly do you mean—integral?"

"Well, let's talk one-piece construction. You see, fins are extruded right from the tube wall. Because the tube is finned, you get more heat transfer surface in a smaller area. And, because the fins are an integral part of the tube, you get more heat transfer. In short: vibration, temperature shock, pressures can't jar the fins loose. Your problem isn't any different than the one we had a month or so ago. This company had a small stand-by condenser—they also needed to boost their total condensing capacity. So, they retubed the small unit with Trufin and hooked it up in parallel with their larger prime surface unit. Well, production of the smaller Trufin unit equalled that of the larger prime surface installation. As a result, they eliminated the need for an entire new condenser!"

"Boy! If we can only do that, too!"

"You can! I'll outline the idea in a letter to you this afternoon. I can prove that you will save in the long run."

WHEN IT'S TIME TO RETUBE: be sure to consider Trufin. *It pays!* It's available in copper, copper-base alloys, aluminum, bi-metal, electric-welded steel and other metals. And write for a copy of Wolverine's Trufin Data Sheet. You'll find all the information you'll need. WOLVERINE TUBE DIVISION of Calumet & Hecla, Inc., 1475 Central Avenue, Detroit 9, Michigan.



Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario

*REG. U. S. PAT. OFF.

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DIVISION OF CALUMET & HECLA, INC.
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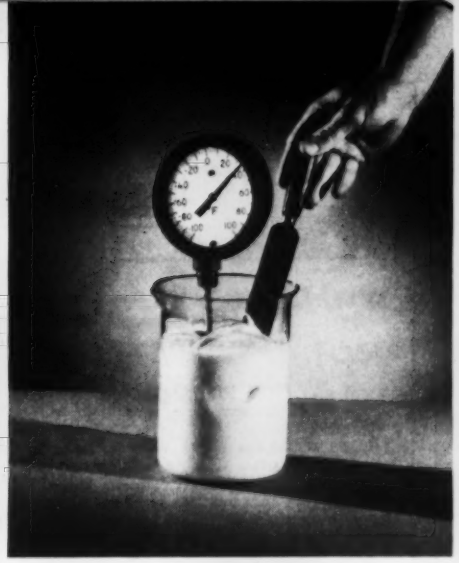
Now Better Than Ever!

Sunoco Emulsifying Cutting Oil

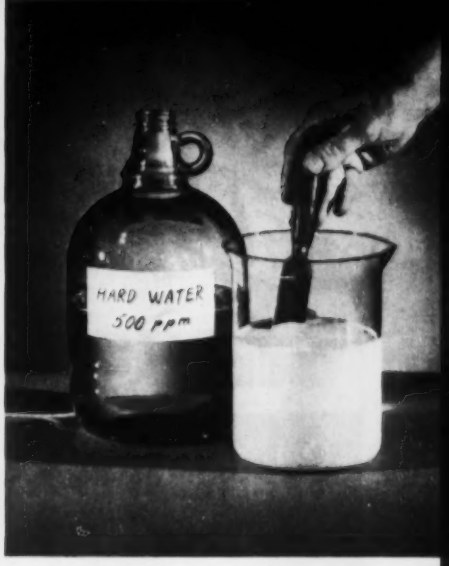
New refining facilities improve industry's most widely used cutting oil and permit it to give these added benefits

- **HIGHER MACHINING EFFICIENCY**—better finishes, longer tool life, increased production in cutting operations
- **INCREASED DETERGENCY**—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
- **BETTER MIXING QUALITIES**—in hot, cold or hard water
- **A PURER, CLEANER CUTTING OIL**—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- **EASIER HANDLING**—pumps from storage tanks more readily, flows from drums faster
- **GREATER VERSATILITY**—can be used for rolling, washing and rustproofing as well as cutting and grinding

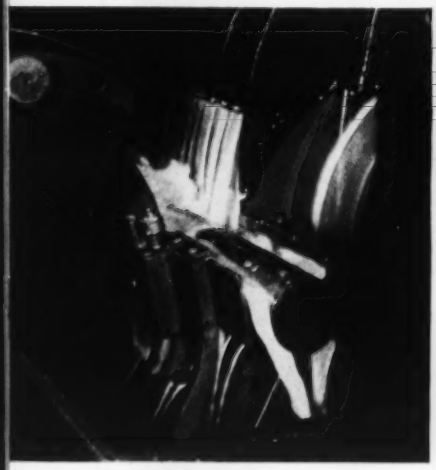
MIXES BETTER IN HOT WATER. New S.E.C.O. mixes and remains stable even at 180 F. This permits its use in washing and rustproofing.



MIXES EASILY IN COLD WATER. New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.

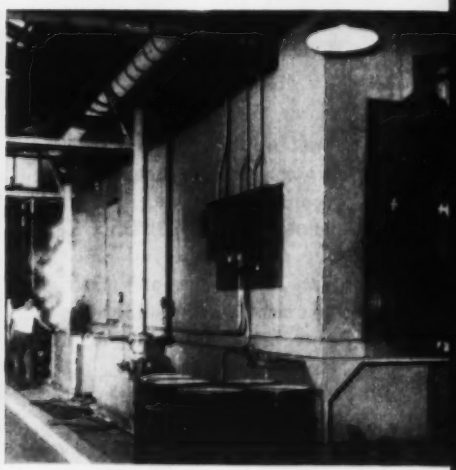


MIXES READILY IN HARD WATER. New S.E.C.O. eliminates the need for special hard-water grades of emulsifying cutting oil.



GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.

RUSTPROOFING. New S.E.C.O. is a better hot rustproofing medium. It forms stable emulsions, coats metal parts uniformly, protects them against rusting.



WASHING. Because of its increased detergency and its ability to mix and remain stable in hot water, New S.E.C.O. is better for removing grease and dirt from metals.

TEST THIS NEW S.E.C.O. IN YOUR OWN PLANT. For more information, call your nearest Sun office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. S-7.

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★ HEAT-TREATED, CASE OR FLAME-HARDENED

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Travel by air is an integral part of our everyday living — both for business and pleasure. In everyday business, air transport makes it possible for personnel, materials and finished products to arrive at destinations in a mere matter of hours, when, a few years ago, the same mileage required days or even weeks. For pleasure, it enables the vacationist to reach many far-away places in less than a day — a modern "magic carpet."

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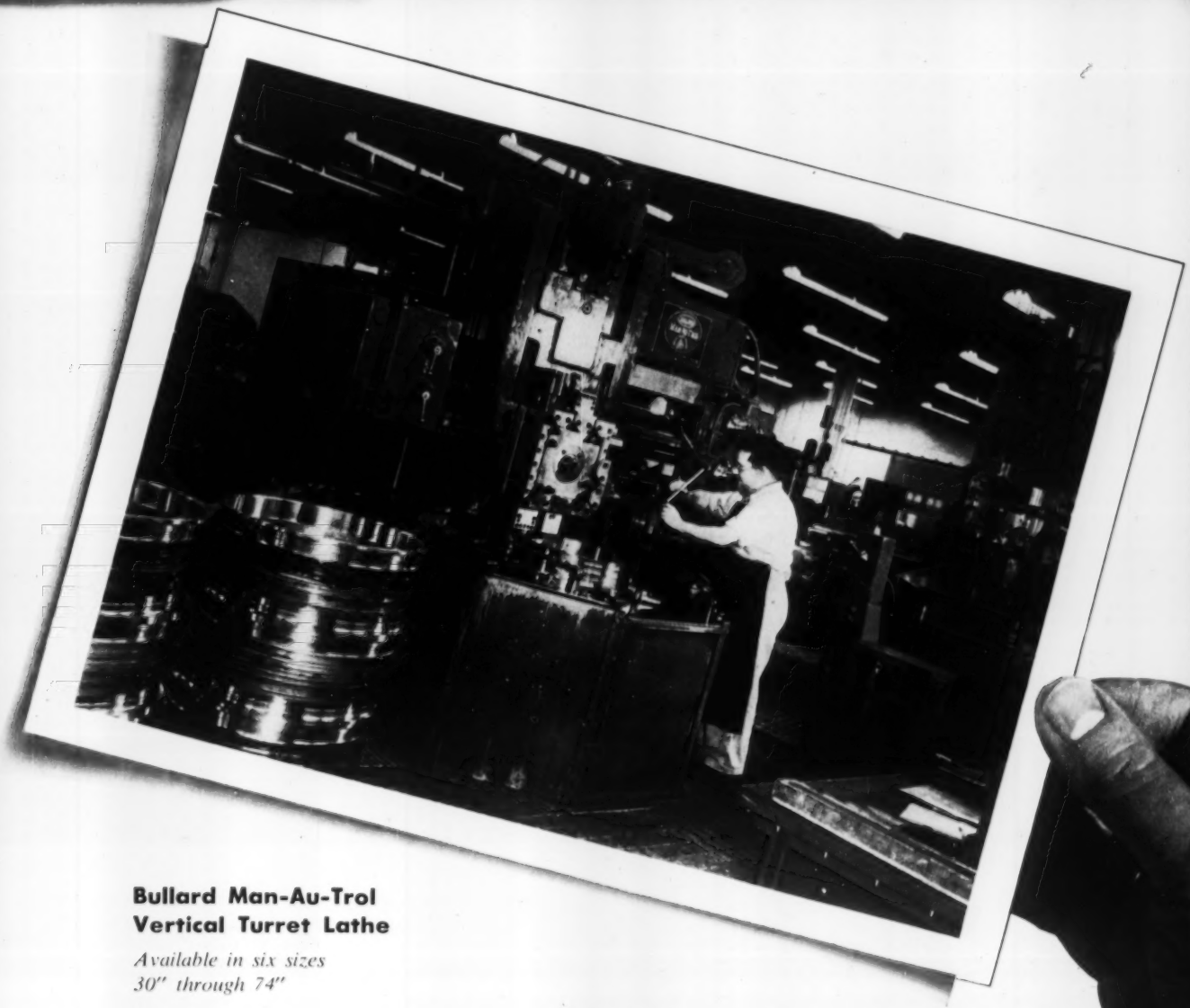

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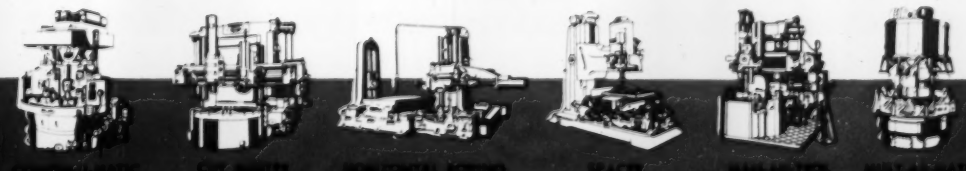
Available in six sizes
30" through 74"

It's the cost per cut that counts! The Man-Au-Trol Vertical Turret Lathe, because of its inherent built-in flexibility and versatility, reduces cutting costs to a minimum. The machine may be controlled either manually by the operator or entirely automatically by Man-Au-Trol.

Simple operation, minimum time for operator training, all controls within easy reach, less operator fatigue and low maintenance cost with a minimum of down time are profit plus operating factors offered by the Bullard Man-Au-Trol Vertical Turret Lathe. Ask your Bullard Representative for all the facts or write to The Bullard Company, Bridgeport 2, Connecticut — phone EDison 6-2511.



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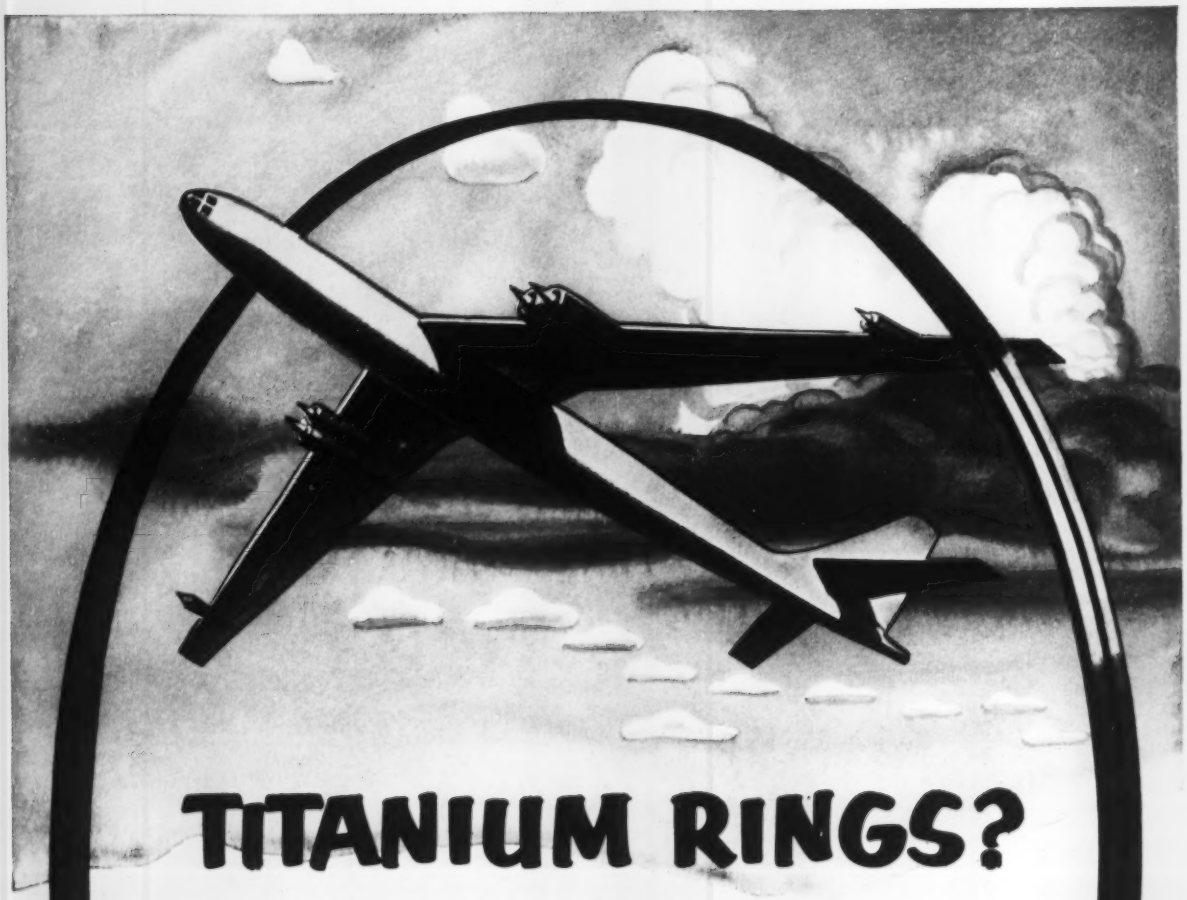

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In 1950 American Welding completed the first successful production flash butt-welding of the new wonder metal — Titanium Alloy. Since that time hundreds of Titanium components have been produced in our plant.

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The Maintenance Market

Take another look at the maintenance and repair construction market. A record $18 billion of the total $36 billion to be spent on all construction this year probably will go for that type of building. Many firms shy away from that business because of smaller sales, more fussing required. That's why there may be room for you. The Commerce department reports a steady climb in maintenance and repair expenditures—$10.2 billion in 1947, $11.7 billion in 1948, $11.8 billion in 1949, $11.8 billion in 1950, $13.1 billion in 1951, $14.0 billion in 1952 and about $17 billion last year.

Continental Spending?

Some of Ford Motor Co.'s proposed $1-billion-plus expansion will probably go into equipment and facilities for its new car, the Continental, which is still under wraps. Since 1948, Ford has invested more than $1 billion in new plant and equipment. Vice President Benson Ford says the new expenditures under consideration will more than match that.

The Locals Offer a Hand

At least two United Auto Worker-CIO locals have now gone on record to help the companies whose workers they represent. Local 689 says, "We'll give in a little financially to keep the plant going." It represents Pressed Metals of America Inc., an automotive supplier whose directors are studying the possibility of liquidation because it has lost some Ford and Chevrolet contracts. In May Local 12 offered to take over the distributorship of Kaiser and Willys cars in Ohio. Last week Kaiser Motors Corp. President Edgar Kaiser turned the proposal down, in part because he thought the union lacked experience to manage an auto distributorship.

Different Tack

Several unions around the country are modifying tactics in their dealings with small plants, such as screw machine product shops. The labor men are trying to organize all or nearly all the jobbers in a particular industry in one area. Then all the contracts are written to expire on the same date. The union can then close down all or nearly all the jobbing capacity of one industry in a city and thus have a more effective bargaining position.

For Industrial Research: $1.6 Billion

Research expenditures by American industry alone will reach a record $1.6 billion this year. Spending by government, educational institutions and medical groups will boost the total outlay to more than $3.5 billion in 1954 (p. 40). In 1941 U. S. industry spent about $510 million for re-

search, $1 billion in 1947, $1.5 billion in 1953. Although the U. S. now has about 800,000 scientists and engineers, there's still a shortage of about 90,000.

Administrating Engineer

One reason why there's a shortage of engineers may be because so many engineering graduates are no longer primarily engaged in that kind of work. J. E. Walters, Rutgers University, told the American Society of Mechanical Engineers that 40 per cent of all industrial executives today are engineers and that 60 per cent of all engineers are engaged in administrative functions 20 years after graduation.

Needed: A Policing Job

American industry is more and more plagued by its inability to police infringement of its patents by foreign manufacturers. The situation in the photographic products industry is so bad that representatives have lodged a complaint with Commerce department's Business & Defense Services Administration.

SBA Studies Loan Policy

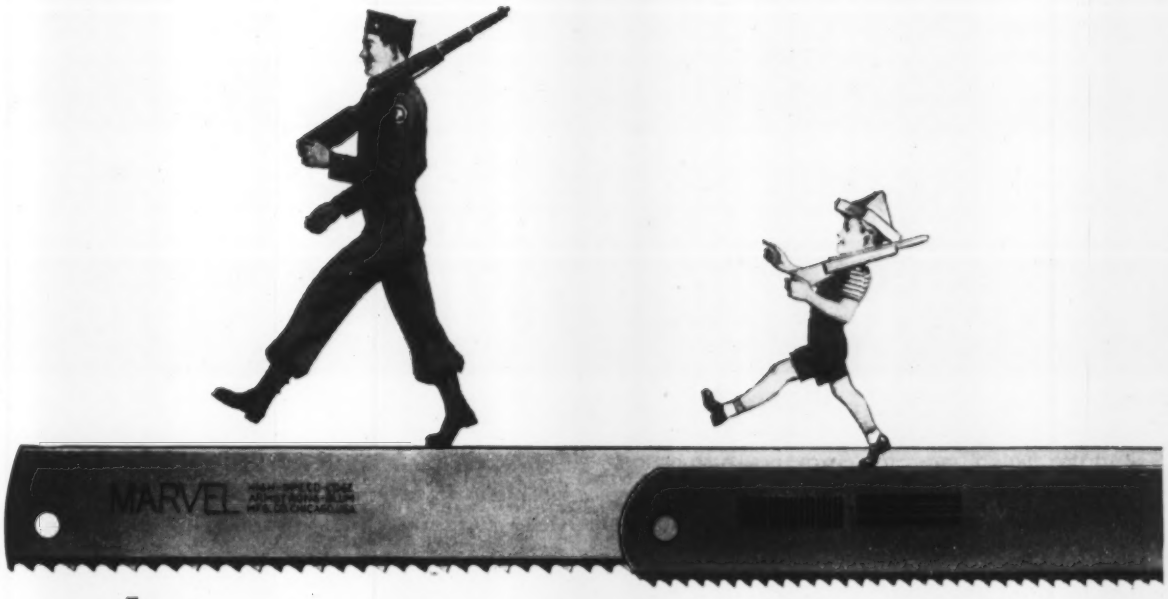
Small Business Administration is making loans at a rate of about $2.5 million a week. It's considering delegating to its 14 regional directors the authority to approve small loans not exceeding $50,000 to any one borrower. In about two-thirds of the cases, SBA joins with banks in making loans. The agency is forbidden to make a direct loan until the applicant has exhausted all his sources of private lending.

Straws in the Wind

Republic Aviation Corp. estimates that 16 per cent of the aluminum produced in the U. S. goes into the manufacture of airplanes . . . General Services Administration by July 1 had completed the transferral of 13 government-owned defense plants from the National Industrial Reserve to the Departments of the Army and the Navy . . . More 12-volt ignition systems are in prospect for the American motorist . . . Rep. Robert T. Secrest (Dem., O.) has been nominated as a member of the Federal Trade Commission to succeed Albert A. Carretta whose term expires Sept. 25 . . . Willys Motors Inc. has closed down Kaiser and Willys auto output until Aug. 16.

This Week in Metalworking

Now that the steel industry has settled for 10 to 12 cents an hour with the union, a steel price increase averaging $2 or $3 a ton is likely (p. 29) . . . Your method of paying your men can be made to pay off in improved labor relations (p. 30) . . . A moderate upturn in components-buying is ahead, judging from returns to STEEL's quarterly survey (p. 32) . . . Defense buying may hit $4 billion a month in this half because of the new $28.8-billion appropriations for the Defense department (p. 35) . . . Two diametrically opposed bills introduced in the Senate once again revive the question of freight absorption's legality (p. 36).



. . . *but*
Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

MARVEL *Metal Cutting* SAWS

Better Machines-Better Blades

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USING SHEET or STRIP STEEL? *Really,*

you don't need an emergency to profit from

Reliance JOB-FITTING Service

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Normally though, warehouse services like ours, take care of the regular, day by day or month by month requirements of sheet and strip steel users. Some are for fill-in purposes; then again, many a job runs steadily on warehouse steel exclusively.

But Reliance *Job-Fitting* service, as you will find, goes beyond routine order-taking-and-filling. For example—helping customers lick production problems involving the use of sheet and strip steel; suggesting practical ways of averaging-down steel costs.

No, it needn't take an emergency for you to use Reliance *Job-Fitting* service profitably.

Why not try us the next time you need sheet or strip steel? We honestly believe you'll like the way we work *for* and *with* you.

T M REG U S AND CANADA

DEPENDABLE DAN will take care of it for you!

Here's the gist of the Reliance JOB-FITTING idea—

. . . It's knowing our "stuff" . . . our "feel for steel."

. . . It's knowing your job . . . what you expect the steel to do for you.

. . . It's supplying in-stock sheet and strip best suited to your immediate need.

FOR HELPFUL ACTION CALL OUR NEAREST PLANT OR OFFICE

RELIANCE STEEL DIVISION

Processors and Distributors JOB-FITTED Sheet and Strip Steel

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GENERAL OFFICES
DETROIT 9, MICHIGAN

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Industrial Statesmanship

Several decades ago changes in the appearance of most American cities occurred when the expanding downtown commercial business district encroached upon fashionable residential sections. This caused well-to-do citizens to build new homes farther from the center of the city. The deserted fine old homes became boarding houses, were torn down for parking lots, or were taken over by secondhand car dealers.

Today changes in American cities are much more numerous and complex. A rapidly increasing standard of living is luring millions of families from the central areas to the more attractive outskirts. At the same time, dozens of factors are inducing managers of industrial companies to abandon obsolete plants in congested central districts and to start anew in one-story, rambling, efficient plants in ample, park-like acres in the suburbs.

This exodus from core to rim poses serious problems. The parent city loses tax revenue which goes to satellite suburbs, yet it usually is burdened with the responsibility of providing water, sewerage, transportation, educational, library and other services not only to its own citizens but to those of its neighboring cities, towns and villages.

County commissioners, mayors and councilmen have been attacking these problems for years with scant success. Not long ago, a few Pittsburgh industrialists—realizing that rot in the heart of a great city can be costly to those who depend upon it for business—took the initiative in what has turned out to be a spectacular urban rehabilitation project. They transformed the "golden triangle" from a rapidly deteriorating area into one of the most dramatically progressive spots in the nation.

The example of Pittsburgh industrialists prompted Cleveland metalworking executives to take a hand in the city's serious "exodus-from-core-to-rim" problem. They are investing $2 million of corporate money in a revolving fund which will be used to move people out of the worst slum areas so that these sections can be rebuilt. Once one distress area has been cleaned up, the money can be diverted to another sore spot.

This is not altruism. It is industrial statesmanship of the highest order.

E. C. Shaner

EDITOR-IN-CHIEF

WORLD-WIDE RESEARCH: As reported in these pages some months ago, Battelle Memorial Institute of Columbus, O., established research laboratories in Frankfurt, Germany, and Geneva, Switzerland, and opened offices in Milan, Paris, London and Madrid. Today this international expansion (pp. 40, 41) has progressed to the point where definite ac-

tion can be reported. At Frankfurt 200 persons are employed and Battelle researchers are at work on 40 projects sponsored by enthusiastic German industrial companies. At the Geneva laboratory, 70 persons are employed and although this laboratory has been in operation only a month, its staff already is working on six important projects.

Battelle's European venture is the brain child of Dr. Clyde Williams, Battelle's able president and director. He believes that the interchange of research among free nations is tremendously important. This may be an understatement. It could be that world-wide research, as envisioned by Dr. Williams, is a force much more potent than all the political point-four programs ever proposed—and at no cost to the taxpayer.

* * *

PRICE INCREASES DUE: Although it is doubtful whether informed persons had any real fear that a stalemate in the recent contract negotiations would lead to a steel strike, there were definite signs of relief on all sides when a settlement was reached more than 36 hours before the old contracts expired. In a nutshell (p. 29), the agreement calls for a wage increase of 5 cents per hour and improvements in pension plans and insurance which will bring the total cost up to 10 cents per hour, plus or minus.

In a company where the package actually figures out to 10 cents per hour, the cost of making a ton of finished steel would be increased about $4. In the present competitive market it is doubtful whether steel producers would attempt to pass all of this increased cost on to their customers. Perhaps some of them may try to pass on half or perhaps three-quarters of the added cost, which would mean price increases in the range of $2 to $3 per ton of finished steel. Even so, the increases would not be uniform. Some prices would be upped sharply, some moderately and others would remain unchanged.

* * *

SKILLED JOBS RISING: A study by the Council for Technological Advancement entitled "Trends in Technology and Employment" (p. 31) shows clearly that technological improvement since 1939 has had a marked effect upon the kind of jobs in greatest demand. For instance, the proportion of jobs in manufacturing has increased. Jobs calling for manual labor have declined in number and in proportion. The demand for jobs requiring special skills is expanding.

These changes in the kind and proportion of jobs deserve more attention than they have received to date. For one thing, they hold a valuable clue to the type of job training industry should be doing for the future. Also they indicate strongly the need for more and better supervisory personnel from foremen up.

* * *

GOOD PAY TECHNIQUE: According to studies made in two industrial areas, most metalworking companies pay their employees by check. In greater Pittsburgh 77 per cent of the metalworking establishments pay by check (p. 30) and 23 per cent by cash. In the Cleveland area 90 per cent of the large companies and 84 per cent of the small companies pay by check.

Whether your company pays by check or by cash, it might be a good idea to check into how smoothly and efficiently your paymaster operation is functioning. If your employees have to stand in line too long, have undue difficulty in cashing checks or are subjected to any other unnecessary inconveniences on pay day, then you have a chance to do an effective employee relations job by correcting the pay system immediately.

* * *

RFC—REST IN PEACE: Reconstruction Finance Corp., born Jan. 22, 1932, under the Republican administration of President Hoover, died last Wednesday, June 30, 1954, under the Republican administration of President Eisenhower. Its affairs will be wound up by a corporation operating under the direction of the Treasury department.

During its 22 years, RFC traced a colorful career. It did bail out companies in trouble with great credit to its judgment. Likewise it made questionable deals with opportunists which stank to high heaven. Mink coats became a drug on the market. But in the metalworking industry there should be some satisfaction in the knowledge that the largest RFC private loan was to a steel company—for Kaiser's plant at Fontana—and that it did not turn sour.

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Jones & Laughlin Steel Corp.

Steel Spiral Takes Another Twist

A STEEL PRICE increase, which may average $2 or $3 a ton, is coming up now that the steel industry has made a 10 to 12-cent labor contract settlement.

A rule of thumb has it that steelmaking costs go up 40 cents a ton for every penny rise in wage costs. Thus, costs this time will climb as high as $4.80 a ton. The consensus is that the industry will have to absorb part of that.

The Problem—But it can't afford to absorb all, as National Steel Corp. Chairman Ernest T. Weir points out. He shows that only once in the past 26 years, in 1953, have net steel earnings been within one percentage point of the all-industry average, and even then it was 0.9 per cent below the average. Mr. Weir emphasizes that steel has an obligation to make fair earnings and pay fair dividends on a dependable, regular basis to obtain funds to maintain and expand its plant. "The cost of that obligation must be shared by the consumers of steel," he says.

William Bausch, sales vice president for Follansbee Steel Corp., echoes the sentiment of many steel executives when he says: "Some increases in price are inevitable." He and others believe the boosts will be selective among the various products, depending on both the individual profit situation for the item and the demand for it.

The Terms — Virtually all the basic steelmakers were signing up last week for about the same terms negotiated by U. S. Steel Corp.'s John A. Stephens and the Steelworkers' David J. McDonald. The agreement is close to what STEEL predicted Mar. 1, p. 51:

Five cents an hour in direct wage increases across the board. The starting rate becomes $1.57 per hour, and the present spread of 5½ cents between job classes is retained. The five cents may cost industry six because of higher overtime and vacation pay which results.

Four cents an hour in increased contributions for insurance, to be split by the company and the worker.

A pension boost from $100 to $140 a month. An employee retiring after 65 with 30 years' services will receive a minimum pension of $140 a month, including the federal social security contribution, now $85 a month. Future increases in social security will increase the employee's total pension. That's a departure from the old formula which permitted the company's contribution to decline as social security went up. The cost for the increased pension benefits varies from company to company according to the methods of funding and the age groupings. At best, the gains will cost at least 3 cents per manhour; at worst, 5 cents or more.

The Dates — The term of the basic agreement covering wages, hours and general working conditions runs from July 1, 1954, to June 30, 1956, subject to one reopening on May 1, 1955, on wage rates only. The insurance agreement goes into effect Nov. 1, 1954, and will continue until Oct. 31, 1956. The pension agreement goes into effect Nov. 1, 1954, also, but it runs until Oct. 31, 1957.

Both sides are conspicuously silent about the guaranteed annual wage.

A spot check by STEEL reveals that most steel users expect a price increase, will grudgingly accept a $2 or $3-average boost, but will protest anything higher. Most consumers say: "We will have to absorb all or most of any increase." A $2 increase would boost the cost of steel in a refrigerator about 25 cents, in a six-room house about $7.70, in a four-door auto about $3.55, in a turret lathe about $8.05, in a 50-ton box car about $41.50.

Last year after an 8½-cent settlement, the steel industry boosted prices an average $4 a ton.

Jones & Laughlin Steel Corp.

Cash in on PAYDAY

Better labor relations and no production losses are possible through good payday techniques

"PAYDAY!" That's the answer you'll get most often when asking a worker what's the best day of the week.

That response, even though often given facetiously, offers a clue to one avenue to better your labor relations. Thompson Products Inc., Cleveland, saw the opportunity and now provides plant facilities for its workers to cash their paychecks. Result: Better sentiment toward management.

Importance of Paying—Those few moments when an employee receives his check are highly important to management, points out the Associated Industries of Cleveland. That's the time the partnership of management and labor is best expressed. Most AIC member companies have foremen distribute checks personally, thus giving the employee a better sense of recognition by management.

How do you pay your men? A steadily growing number of companies prefer check payment; frequency of payment varies. In Pittsburgh an industrial survey among metalworking companies of all sizes shows that 77 per cent pay by check and 23 per cent by cash. An AIC survey reports more than 90 per cent of large companies and 38 of 45 firms with less than 50 employees pay by check.

Check Advantages—Most large steelmakers prefer check payment. Pittsburgh Steel Co. finds check payment safer than handling cash. It has arrangements with banks in plant areas for cashing checks. Most U. S. Steel Corp. plants prefer handling checks because they are cleaner, pay can be distributed on the job and men don't have to line up, interrupting production. Checks eliminate the possibility of argument on amount of money in the envelope.

Several objections are made to check payment. It is more expensive than handing out cash. Bankers near mills often complain about "that twice-a-month stampede to cash checks." The United Steelworkers of America has no official preference as to how men are paid, but many workers want cash quickly and object to waiting in long bank lines. When facilities are crowded, workers may be forced to cash checks at stores or taverns. This can cause unnecessary expense as well as lost time for labor and management.

Cash Payment—To solve these check-cashing difficulties growing numbers of companies rely on outside services such as Brink's Inc., Chicago. Brink's and subsidiaries operate nearly 1000 armored cars, transporting about $1 billion daily for banks, industrial firms and business houses.

For companies paying men by cash Brink's fills and delivers the payroll envelopes to the employees. This eliminates risk to the employer of having large amounts of cash on hand. Where industrial firms pay by check, Brink's will cash checks, bringing the necessary funds to the plant on payday. Brink's will also install special safes on client's premises which can be opened only by a Brink's employee.

Other Plans—Management is continuing to improve payment methods. Westinghouse Electric Corp., Pittsburgh, delivers checks to work stations, keeping production continuous. Slow-moving lines at pay windows displease both labor and management. In sales districts Westinghouse will mail checks to the employee at his selected address.

An increasing number of industrial firms offer the latest in a series of ideas for streamlining payday: They will deposit checks in the employee's bank account on request.

USS To Issue Debentures

United States Steel Corp. proposes to sell $300 million serial debentures maturing in one to ten years to restore, in part, working capital expended in recent years in the corporation's expansion and modernization program.

Of the total, $225 million will be offered to the public, and the rest will be offered to United States Steel & Carnegie pension fund, trustee of a pension trust established for the benefit of USS employees. The company will file a registration statement soon with Securities & Exchange Commission and make the offering at a convenient time later.

Aluminum Write-Offs Won

Revere Copper & Brass Inc., Clinton, Ill., was awarded the largest fast tax write-off certificate granted by Office of Defense Mobilization in the two-week period ended June 16.

Revere Copper's certificate was for $8.8 million, 50 per cent rapid amortization allowed, for aluminum sheet and plate facilities. Kaiser Aluminum & Chemical Corp., Trentwood, Wash., and Reynolds Alloys Co., Listerhill, Ala., received certificates for similar facilities. Kaiser's grant was for $1.4 million, 50 per cent allowed, and Reynolds' certificate was for $2.1 million, 50 per cent allowed.

Industrial Building Costs Rise

Industrial building costs, as measured by Austin Co., Cleveland, advanced from 189 per cent of the 1926 base period to 190 per cent during the spring quarter. After holding at the lower figure for three successive periods, the index was forced up mainly by wage increases which averaged at least 10 cents per hour countrywide.

George A. Bryant, president of Austin, says reductions in materials handling costs partially offset the increased wages. Most building material prices remained unchanged over the period.

RFC Out—FFC In

Federal Facilities Corp.—that's the name of the new federal agency which operates government-owned rubber, tin and abaca fiber plants formerly run by the Reconstruction Finance Corp. RFC expired July 1.

Electronics Go West

The West's expansion in electronic equipment production has led to the appointment of a general manager of the West Coast Electronic Manufacturers Association. Don Larson will co-ordinate the activities of WCEMA's 165 member companies who expect to produce over $750 million worth of equipment this year.

TECHNOLOGY SHIFTS JOB HORIZONS

GROWING JOBS	Increase 1940 to 1950 Number	%
Operatives and kindred workers (manufacturing)	1,800,000	50
Sales workers	852,000	27
Stenographers, typists, secretaries	531,000	50
Bookkeepers, cashiers	307,000	48
Auto mechanics, repairmen	278,000	75
Engineers, technical	249,000	90
Managers, officials, proprietors (manufacturing)	230,000	55
Foremen, manufacturing	218,000	75
Accountants, auditors	157,000	71

DECLINING JOBS	Decrease 1940 to 1950 Number	%
Farmers, farm managers	838,000	16
Farm laborers, foremen	706,000	23
Laborers (manufacturing)	231,000	17
Mine operatives, laborers	73,000	11
Blacksmiths, forgemen, hammermen	24,000	30

Source: Council for Technological Advancement.

Training: Technology Forces Expansion

The nation's technological revolution is forcing an upgrading of the labor force. Industry will have to take a more active part in employee training

IS YOUR TRAINING program keeping pace with your skilled labor and technical employee needs?

Council for Technological Advancement's study, "Trends in Technology and Employment," shows that training should be one of management's chief personnel concerns. Technological advancement since 1939 has had these effects on manufacturing employment:

The Effects—1. The proportion of jobs in manufacturing is greater than in the past. Manufacturing employment increased 70 per cent compared with 22-per-cent increase in the population. Today about 25 per cent of the total labor force is in manufacturing, compared to 21 per cent in 1929, 17 per cent in 1935 and 19 per cent in 1940.

2. Jobs calling for manual labor (see the table) have declined both in number and proportion.

3. Demand for specialized skills is expanding.

The Trend — Pointing up the need for an upgraded worker are CTA's figures showing that unskilled laborers in manufacturing declined from 1.3 million in 1940 to 1.1 million in 1950 while total employment increased sharply. Craftsmen, foremen and kindred workers, on the other hand, increased from 9 per cent of the total work force in 1940 to 12 per cent in 1950. Yet there were not (and still aren't) enough men to meet industry's needs.

Similarly, about 1 in every 50 employees in industry today is an engineer, compared with a ratio of approximately 1:100 about 20 years ago. It's estimated that industry was short about 60,000 engineers last year; no easing of the situation is forecast.

The Challenge—More and more emphasis is being placed on research and technological advancement (see page 40). As the technological revolution continues, industry will have to develop its own employee upgrading program to meet its personnel requirements.

Components: More Buying Due by Fall

Some inventories are still being reduced, but the serious stock cutting is about over. The excellent delivery situation keeps working stocks lower than formerly

ORDERING of most components should undergo a slow revival during the next quarter, STEEL's latest survey indicates. But a full-scale pickup isn't likely until fall.

The components business dip has definitely leveled off, though; most users have inventories right about where they want them. This should call for some jump in new orders, but the delivery situation is so easy now on most items that buyers have no inclination to build up stocks. In fact, some buyers are even allowing their stocks to fall below what they themselves consider ideal levels. "No trouble to get any reasonable delivery," was a frequent comment on the survey questionnaire.

Snags—Some respondents did indicate difficulty in obtaining a few components — notably fractional horsepower electric motors and to a lesser extent antifriction bearings and electrical equipment parts (solenoids, relays, switches, etc.).

About nine out of ten respondents—almost exactly the same percentage as last quarter—report that their general inventory situation is better than it was a year ago.

Promises—About 35 per cent report being influenced by promises of quick delivery. Again, this is the same figure as in the previous survey—another indication that the components picture hasn't changed much in the past three months.

And again pointing to the leveling off, 95 per cent of the respondents indicate that their general inventory and delivery situation is now adequate. High finished inventories is a chief complaint among the remaining 5 per cent.

Judging from STEEL's survey, components likely to feel the upturn first include air hydraulic cylinders, some electrical equipment parts, electric motors, forgings and gears. These items have shown the biggest drops in inventories during the last quarter.

Lower Stocks—For 15 components, more users now are inventorying for 10 days or less than were a quarter ago. Fewer users are carrying stocks in the 10-to-30-day and 30-to-60-day ranges. In the longer term categories, the situation is about the same as a quarter ago.

No respondents reported buying from irregular or foreign sources, again indicating that most components are plentiful.

Answers in Renegotiation

Renegotiation problems? Maybe the Renegotiation Board's new booklet will be of help.

It explains, for example, that the partial exemption extended to machine tools does not apply to castings and other materials used in the construction of machine tools. It also explains that the percentage of use rule may not be applied in determining renegotiability of machine tools bought by the contractor for government account.

The 25-page booklet may be obtained from the board's regional offices.

Pickup in Drop Forgings Coming

DROP FORGING shipments in the first six months of this year are off about 16 per cent from the first half, 1953, total of 828,380 net tons, but the industry sees an upturn coming in the fall. Last year deliveries dropped in the second half.

But now sales to makers of earthmoving and roadbuilding machinery and to the oil industry generally are holding up well and are expected to get better. Farm machinery builders show signs of shelling out some orders and so do makers of railroad equipment. And auto industry tooling for 1955 models also should give the drop forgers a boost.

From a Survey—STEEL's latest quarterly survey on components (see above) shows that some other users of forgings are getting close to or below what they consider ideal inventory levels; they should be coming back into the market soon.

Another sign of a coming pickup

Latest Components Picture as Seen by STEEL's Quarterly Survey

(Figures are percentages of those replying to the questionnaire)

COMPONENTS	INVENTORY POSITION					BEST DELIVERY				
	Under 10 days	10-30 days	30-60 days	60-90 days	3-6 mos.	Under 10 days	10-30 days	30-60 days	60-90 days	3-6 mos.
Antifriction bearings (This quarter)	8	23	45	15	9	26	48	14	6	6
(Last quarter)	5	34	34	22	5	29	41	13	10	7
Belting, belt drives	16	32	27	16	9	50	36	11	3	
	4	44	48	4		41	59			
Castings, die	4	22	60	7	7	19	38	33	5	5
		24	52	24		4	54	34	8	
Castings, gray iron	6	50	36	6	2	32	53	15		
	4	35	47	14		27	61	10	2	
Castings, malleable	4	21	64	7	4	9	39	52		
		25	58	13	4	4	36	56	4	
Castings, nonferrous	11	46	29	11	3	35	48	13	4	
	7	37	41	15		30	50	17	3	
Castings, steel		28	64	5	3			29	71	
	4	21	69	3	3	7	52	38	3	
Couplings, hose	15	22	48	15		63	31		6	
	8	56	32	4		42	37	21		
Cylinders, air, hydraulic	24	24	35	11	6	10	50	40		
	6	24	40	24	6	24	29	38	9	
Electrical equipment parts	13	21	41	19	6	12	46	27	11	4
	7	26	48	15	4	19	51	22	8	
Electric motors (fractional)	22	30	17	17	14	15	42	39	4	
	25	25	29	8	13	26	33	30	7	4
Electric motors (1-5 hp)	28	33	20	11	8	30	35	35		
	29	38	29		4	40	28	24	8	
Electric motors (over 5 hp)	30	35	20	15		33	28	28	11	
	22	43	7	7	21	22	34	22	22	
Fasteners		50	24	13	13	35	39	23	3	
	2	32	49	15	2	28	50	15	7	
Forgings	5	15	49	29	2	4	42	35	11	8
	3	30	34	27	6		44	34	13	9
Gears	10	24	32	22	12	4	44	36	16	
		29	50	21		16	36	32	10	6
Rubber Goods, mechanical	6	30	43	15	6	23	54	20	3	
	9	34	42	15		29	34	31	6	
Screw machine products		26	45	19	10	16	51	33		
	2	29	39	25	5	13	51	31	3	2
Springs, wire shapes		24	41	28	7	9	60	25	3	3
	3	14	65	9	9	16	33	49		2
Stampings	2	22	54	20	2	6	53	35	6	
		37	46	17		5	59	32	4	
Weldments	24	19	33	19	5	7	57	36		
	14	29	50		7	19	50	25	6	

is the increasing number of "urgent" orders. "Customers want delivery right away," notes Charles Hall, secretary, Cleveland Hardware & Forging Co., Cleveland.

Faster Deliveries—And the industry is doing its best to meet this schedule. C. E. Stone, president, Interstate Drop Forge Co., Milwaukee, says, "A year ago we were quoting deliveries of 4 to 6 months—now we are saying 'how soon do you have to have it.'"

Better availability of steel and the drop in new orders account for much of the improved delivery situation. Some companies are quoting less than one-third the lead time of a year ago which generally means delivery in from 2 weeks to 3 months depending on the particular drop forger and the item ordered.

Happenstall Co.

Defense orders—important to some shops, relatively unimportant to others—probably won't account for much of any business rise. Present military shipments are only 50 per cent of what they were 8 months ago, according to Ray Seabury, secretary, Drop Forging Association. Some shops report an even greater drop; a few report increases.

Ford Motor Co.

Bombing Attack: Can Your Firm Survive?

TWO COMPANIES, shining examples of what industry can and should do to prepare itself for possible bombing attack, were shown off by Business & Defense Services Administration.

Both have highly integrated plans to insure quick resumption of production in event of enemy air attacks. Both have plans for smooth, continued operation of their companies after sustaining loss of records and possibly key personnel.

Two Examples — Those companies are Koppers Co. Inc., Pittsburgh, and American Machine & Foundry Co., New York.

"We have an over-all company plan and individual plant plans. We not only have acquainted all our people with their responsibilities under these plans, but we have reduced the plans to writing so there cannot be any misunderstanding," says John H. Redmon, assistant production manager of Koppers. "The whole aim is to insure continuity of management and continuity or resumption of production should disaster strike."

Varying Methods — With the same over-all aims, Col. Samuel F. Clabaugh, consultant, American Machine & Foundry says, "We have a cadre of men at other plants who know now that they are to turn over their present duties to successors so that they can go to Buffalo without delay and get that plant back into operation should it be bombed. We're doing that for all our plants located in target areas."

BDSA says that the government is practicing what it preaches. The Government Relocation Plan has been worked out fairly well. Alternate headquarters have been named for all departments and agencies. Men now working in different areas of the country would report to those headquarters in case of loss of top personnel at Washington.

For the Records—"And we have sufficient documentary records (at the alternate headquarters) to enable new people to take over and carry on work of BDSA, particularly the administration of the materials and production lines that would come with another

The Koppers Co. Plan for Action

THIS PLAN for recovery from an enemy air attack is not regarded as ideal for every company. But it may offer suggestions helpful in forming a plan for your organization.

Phase I—TRAINING

1. Screen personnel for security risks
2. Train auxiliary personnel for security duty
3. Train employees in handling emergencies
4. Train key personnel on sabotage prevention
5. Establish emergency shutdown and restoration procedures
6. Establish contact with local civil defense agency
7. Initiate a shelter program using existing facilities
8. Begin program of safeguarding corporate interests, including microfilming records, designating emergency headquarters and making a management succession plan

Phase II—PLANNING

1. Plan for increased security personnel
2. Plan for safeguarding critical equipment and areas
3. Plan for additional fire protection
4. Plan for alternate means of communication
5. Plan for stockpiling replacements and materials
6. Plan for floodlighting critical plant areas
7. Plan for assuring adequate utilities service

Phase III—PROCUREMENT

1. Prepare to construct auxiliary water systems
2. Prepare to construct protection for critical equipment
3. Prepare to construct small shelters for employees

war," says H. B. McCoy, deputy BDSA administrator. Mr. McCoy adds that records at the alternate locations contain names of some 6000 industry men who have had experience in the BDSA and the predecessor NPA. "Industry men who would take over at this alternate headquarters in event of loss of personnel now in Washington already have been informed of their selection for filling these posts in an emergency."

BDSA officials recognize that while individual companies can best plan for continuity in their own managements and production lines, the government has top responsibility for maintaining production at those plants. An unpublicized KFL (Key Facilities List) includes all producers of direct military goods. Defense department has responsibility for those plants. In addition, all defense agencies are represented on an Industry Evaluation Board which works continuously to compile and maintain a list of all plants which must be kept in production if at all possible. Companies on this list have not been informed of their status. But the Office of Defense Mobilization now is considering giving that information to the listed companies and plants.

What's To Be Done — In the meantime, some firms are not waiting for further prodding from Washington. They are studying all possibilities and readying their organizations to tackle any of the problems that might be encountered. The Koppers and AMF plans show what can be done.

You May Be 'Drafted' Too

You as an industrial executive may be called upon to serve in a civilian reserve.

The National Planning Association has recommended a reserve of 5000 qualified executives and specialists be recruited and trained to provide a central nucleus for emergency war agencies. Executives from industrial, labor, agricultural and professional fields would be called upon.

NPA recommends that the Office of Defense Mobilization be made responsible for creating the talent pool.

Defense Spending To Rise

The $28.8-billion appropriations bill will enable buying to hit $4 billion monthly

DEFENSE PROCUREMENT may reach $3.5 billion to $4 billion a month in the second half, compared with monthly obligations of $2 billion to $2.5 billion in the fiscal year just ended.

Obligations for hard goods will average $1.5 billion to $2 billion monthly in the next half, as a result of the $28.8-billion Defense department appropriation bill for fiscal 1955. With the new money, Defense will have about $45 billion in obligatory ability going into this fiscal year.

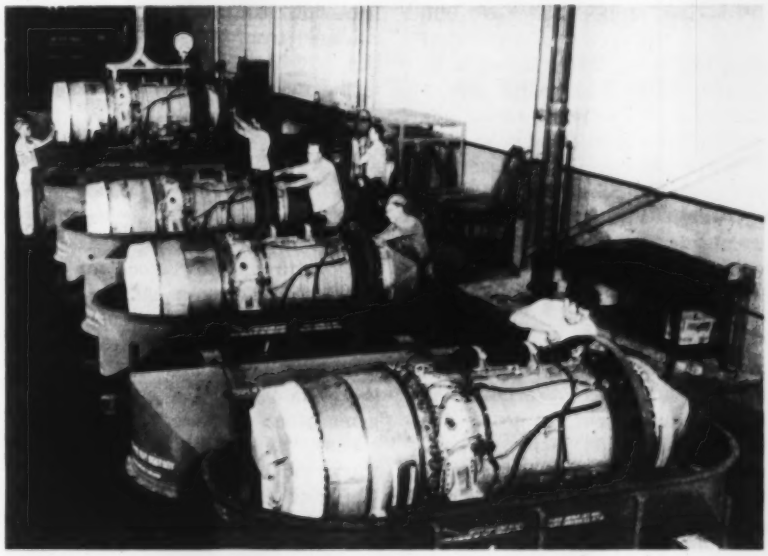
Builders Aided — Machine tool builders should be benefited by the Senate action, sustained by the conferees and passed by the two houses, in making available on a "no-year" basis the $250 million for a machine tool reserve which would have expired June 30, 1954. Defense department spokesmen told the Senate committee they plan to acquire a reserve of such proportions. Details about what tools will be bought, and when, have not yet been worked out by the officials.

The new appropriation makes no change in the armed services' ability to acquire production equipment and facilities aside from the machine tool reserve. At the end of April the department had $875 million available for production equipment and facilities on a "no-year" basis. Of that amount only $93 million had been obligated. So, the department has a lot of latitude in making commitments for production equipment and facilities.

Simplified — House-Senate conferees struck out a Senate provision to require that defense contracts subjected to competitive bidding be awarded to low bidders. Sen. William F. Knowland (Rep., Calif.) helped scotch that one by pointing out the role of shipyards in our defense. To maintain them, it's sometimes essential to award contracts on other than a low-bid basis.

The conferees agreed that defense contracts should not be used to relieve economic distress, but they concluded that it would be confusing to include a new restriction in an appropriation bill when another law already fixes standards for awarding defense contracts.

The measure gives the Air Force $11 billion, Navy $10 billion, Army more than $7.5 billion.



Buick Delivers Its 2000th Jet

Workers at General Motors' Buick Motor Division jet engine assembly plant, Willow Springs, Ill., drop the 2000th Wright J-65 jet engine built by Buick into a canister for shipment to an airframe manufacturer. The 13,000-horsepower engines are used in the Martin B-57 bomber and Republic F-84-F Thunderstreak

By E. C. KREUTZBERG Washington Editor

Freight Absorption: Legal or Not?

Opposing bills by Senators Capehart and Kefauver reopen the fight

THE CONTROVERSIAL freight absorption issue is again before the Senate Judiciary Committee. Businessmen have nothing to be complacent about in present acceptance of the practice.

Diametrically opposed bills sponsored by Senators H. E. Capehart (Rep., Ind.) and Estes Kefauver (Dem., Tenn.) promise a rigorous fight in the Senate over the legality or illegality of freight absorption.

Pro—The revised Capehart bill, S. 3646, is the revival of a proposal which has twice before failed to be adopted. That bill would give a seller complete defense under the antitrust laws if he could show that his lower price or greater service were given in good faith to meet the equally low price or greater service of a competitor. The bill would place on the statute books the main point of the Supreme Court decision in the Standard Oil of Indiana vs. Federal Trade Commission case: A firm cannot be charged with price discrimination when it can show its price differential has been made in good faith and to meet a lawful price of a competitor.

The McCarren bill, S. 540, drawn up in different language, has the same purpose.

Con—The Kefauver bill, S. 1357, again proposes to amend the Robinson-Patman Act so as to eliminate the defense of "good faith" in meeting competition if injury to competition occurs. Should the Kefauver bill be approved by Congress, freight absorption could prove costly to sellers using the practice. Competing selling firms and customers not receiving the absorbed price could claim injury. The Kefauver proposal would not only overturn the Supreme Court decision in the Standard Oil of Indiana case, but it would plunge the freight absorption question back into confusion. The practice emerged from that uncertain state but a year ago after the Republicans took control of the Federal Trade Commission.

Overturning Purpose

Main purpose in reviving the freight absorption issue at this time is to line up forces for next year when Congress will be asked to revise current antitrust laws. Basis of that revision is to be recommendations which will be made late this year by a special study committee appointed by the attorney general. Indications are there will be much strength in the Kefauver corner to try to outlaw freight absorption on bulk commodities such as steel mill products, pig iron, and others.

In introducing S. 1357, Senator Kefauver listed 22 other senatorial co-sponsors, including Republicans Case, Langer, Hendrickson and Payne. It's quite likely the Kefauver bill will be reported favorably by the Senate Judiciary Committee of which Senator Langer is chairman. With such backing, additional support could be whooped up in both houses. The Kefauver bill *could* be passed.

Nonpermanent

Too much reliance should not be given the FTC's present attitude on freight absorption. For years the majority of the commission questioned absorption's legality and not until June, 1953, was that attitude reversed by the Republicanized FTC. At that time Chairman Edward F. Howrey said: ". . . the right to meet a lower price which a competitor is offering to a customer, when this is done in good faith, is the essence of competition and must be permitted in a free economy." A future administration in Washington might lead to a reorganization of a less-friendly-to-business FTC than that of 1953. Freight absorption has taken on something of the complexion of a political issue.

What You Can Do

Manufacturers' and businessmen's associations in Washington are advising their members to let their congressmen, particularly their senators, know now how they feel about freight absorption.

included.
Ordnance Storage Contract Awarded
A contract to move, clean and store more than 3,000 machine tools from Michigan, Indiana and Ohio factories to Fort Custer has been signed with Commercial Contracting Corp., Detroit, Col. Edward D. Mohlere, Detroit Ordnance District commanding officer, announced today.
Work will begin immediately, he said. Storage will be in 96 buildings scattered throughout the fort.
Mohlere said the program will save taxpayers "millions of dollars in capital equipment that might otherwise have to be replaced," and also "will cut in half the time necessary previously to go into full-scale production."

— From Detroit News, May 22

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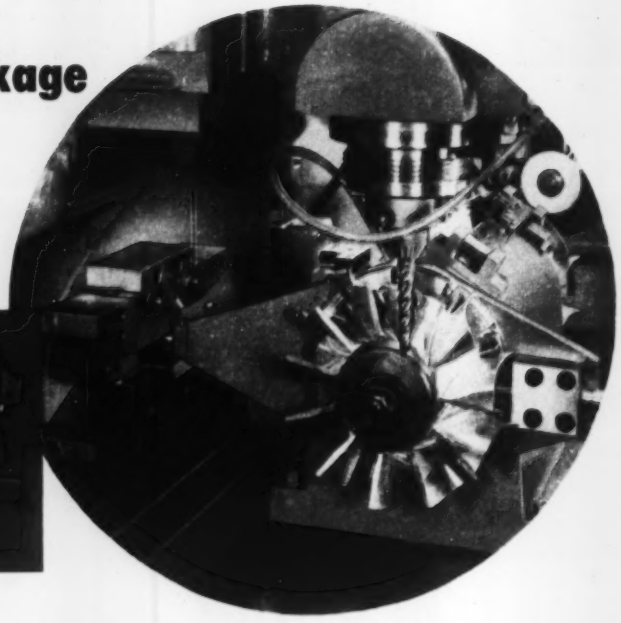

Complete Production Package

CINCINNATI 16" Vertical Hydro-Tel

tooled up by Cincinnati

Part name..... Impeller
Material ..... Aluminum
Operation ..... Automatically mill profile around blades

Complete information on standard 16" Vertical Hydro-Tel may be obtained by writing for catalog No. M-1497-1.

Complete Production Package

CINCINNATI FILMATIC No. 3 Centerless Grinder

tooled up by Cincinnati

Part name..... Universal joint spider
Material ..... Steel
Operation ..... Grind two diameters simultaneously

Complete information on standard No. 3 Centerless may be obtained by writing for catalog No. G-570-3.

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Exporters Need Credit, Not Generalities

MAPI told the Senate Banking Commission government policy on long-term credit for exporters is nebulous, negative. A fourfold MAPI program accents positive action

A POSITIVE approach to medium and long-term financing for American firms engaged in export trade has been called for by the Machinery & Allied Products Institute.

Approval by the Senate Banking Committee of S. 3589, a bill sponsored by Sen. Homer Capehart (Rep., Ind.), brings such an approach one step closer to reality. That bill raises the Export-Import Bank of Washington's lending authority $500 million to a total of $5 billion, divorces the bank from the Treasury department, creates a bipartisan board of directors to replace the present managing directors, and has the avowed purpose of "helping the little fellows export their goods."

Fog-Bound Policy — But, says MAPI's Charles W. Stewart, government policy is still too nebulous and negative on the problem of extended credit financing for U.S. exporters in order to meet foreign competition (see STEEL, June 21, p. 83). Mr. Stewart presented the Senate Banking Committee with a fourfold program.

1. The Export-Import Bank should promulgate a well-defined program to provide, within reasonable limits, medium and long-term credit facilities to enable American capital equipment producers to meet credit competition in international markets.

2. The bank should initiate a program providing for the extension of exporter credits to individual companies (with country quotas if necessary) which will enable an American company to quote credit terms far enough in advance of the consummation of the transaction for such credit terms to be effective parts of the negotiation.

3. A program should encourage wider participation in export credit transactions, not alone by the manufacturer and the Export-Import Bank, but also by private financial institutions. The Export-Import Bank can best accomplish that end by emphasis on the use of guarantees, as distinguished from direct loans.

4. The bank should review carefully the economic criteria it presently employs in acting on individual applications.

Speed It Up—Senator Capehart, during the course of hearings on S. 3589, said divorcing the Export-Import Bank from policy control by the National Advisory Council, a cabinet group headed by Treasury Secretary George M. Humphrey, would speed up the bank's activities, aid in implementing an aggressive loan program.

The bank presently has about $1-billion in loan authority that is uncommitted. Since it was founded in 1934, the bank has made more than $6 billion in loans chiefly to foreign countries.

Brazil May Ask Bank Loan

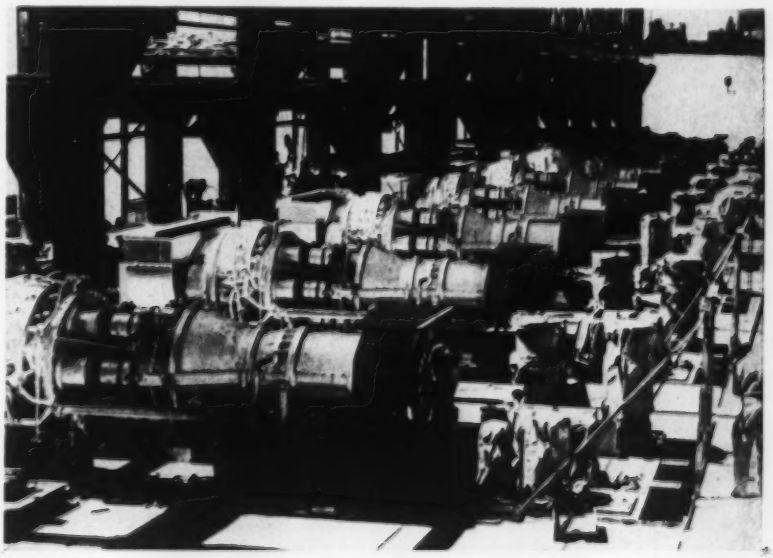
The Export-Import Bank may be asked shortly to extend a loan of $35 million to the Brazilian National Steel Co., Rio de Janeiro, Brazil, for the purpose of buying American steelmaking equipment. The equipment to be purchased would include two or three open-hearth furnaces, 55 coke ovens and rolling-mill equipment. Proposed new steelmaking capacity would boost the Brazilian total output from 710,000 tons to 1.1 million tons annually.

Army Engineers Buy American

Westinghouse Electric Corp. won two Army Engineers contracts for generators for western dams despite lower bids submitted by foreign companies.

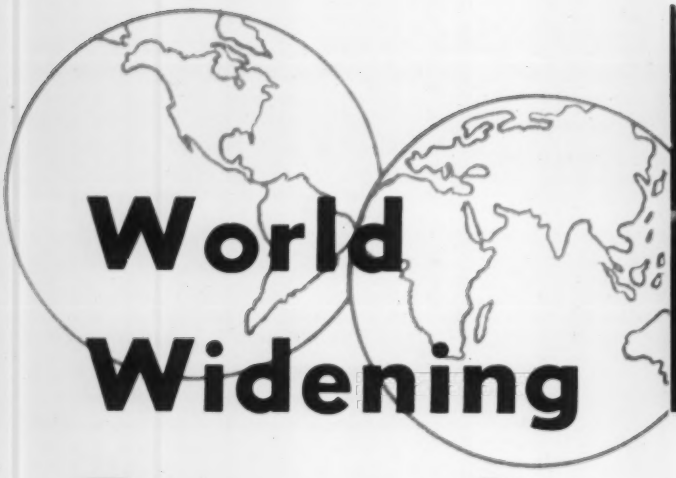
One contract is for $2,180,714 to supply two generators for the Chief Joseph Dam in Washington. English Electric & Trading Co., London, England, submitted the low bid of $1,976,428. The other contract is for $835,938 to supply two generators for The Dalls Dam on the Washington-Oregon border.

An Army Engineers spokesman said the awards were made to Westinghouse because its bids did not represent an unreasonable difference in price over the foreign bids. When that is so, the "Buy American" act provides the contracts shall go to the American firm.



Largest Concentration in the World?

This may be the largest single concentration of gas turbines in the world, says General Electric Co. Besides gas turbines, there's a lot of other GE electrical equipment in the layout of Creole Petroleum Corp., Lake Maracaibo, Venezuela



World Widening Research

"Europe, like America, can get a new lease on economic life through research."

Battelle's Dr. Clyde Williams is fathering a program that exports the institute's applied research know-how. Two labs already operate in Geneva and Frankfurt, and more may come

LAST YEAR, XYZ Co., a midwestern manufacturer, had a problem in metallurgy which it commissioned Battelle Memorial Institute to solve.

Battelle did, at its Columbus, O., laboratories. But, in so doing, it had the knowledge of metallurgical fundamentals of its German staff to supplement the applied research know-how possessed by its American staff.

This year a German company has a problem in metallurgy. The research is being done at Battelle's new Frankfurt laboratory, but the knowledge of applied research procedure of Columbus metallurgists is helping its progress.

Case in Point — Those are examples of how a world-widening research plan fathered by Battelle's Dr. Clyde Williams is paying off for Battelle, American and German industry—and the free world.

Dr. Williams, president and director of the nonprofit research institute, believes that his organization's expansion, which has already resulted in research laboratories in Frankfurt and Geneva, Switzerland, will definitely aid the free world. "We're experiencing a technological revolution," he says. "The economic system of the U. S. has changed from one based upon rich natural resources to one based primarily upon science and technology. Application of technology in Europe preceded that here, but it was largely interrupted by World War II. No doubt the technological revolution will take over as the dominating force in Europe once the physical plants and institutions there have been restored."

Seedling—Battelle is helping to plant the seeds for more applied research abroad with its nonprofit research labs in Europe. Overseas there are government, university and company-sponsored centers, but few, if any, organizations like Battelle that specialize in research management and applied research.

Dr. Williams and his staff hope to help stimulate the kind of growth in technology abroad that has occurred here. Research, the best index to technology's progress, rose in the U. S. from about $160 million in 1930 to $800 million in 1941, $1.3 billion in 1945 and to more than $3.5 billion last year.

Modest Start—Battelle's seeds in Europe are thus far small, but healthy. In Frankfurt, two major laboratory buildings were completed and occupied in 1953. They provide 160,000 square feet of space, compared to about 697,000 square feet in Columbus. Nearly 200 persons are already employed by the German Battelle, and facilities are available for some 600 people.

Frankfurt is already at work on about 40 projects sponsored by German industry, primarily in metallurgy, chemistry, ceramics, and physics. The demand for research by industrialists of that country is so great that the center is well on the way to becoming self-supporting. The benefits that American industry will reap from that center will be indirect, but real. The technical talents of the German staff will supplement those of the American staff and vice versa. "This cross-fertilization of ideas between European

"European scientists are hard workers, ingenious, know their fundamentals."

"The time is ripe now for expansive thinking and bold venturing."

and American scientists has already paid off in new ideas and new attacks on problems," says Dr. Williams.

In Geneva—The Geneva center will also directly benefit American industry, and vice versa, because that laboratory will eventually undertake projects from all over the free world, including from American companies with subsidiaries abroad. Industry in Switzerland is not large enough to support the installation by itself. Although the Frankfurt center is staffed primarily by Germans, scientists from all over western Europe have been recruited for Geneva, which already has a force of about 70 and facilities for some 200.

A new lab there just went into operation last month, and an old chateau had previously been converted to research purposes. New as it is, the Geneva installation is at work on six projects.

More To Come—Besides the two laboratories, Battelle has established offices in Milan, Paris and London and is setting one up in Madrid. Personnel at those offices are technical men who can advise on problems or arrange for study of the situation at one of the institute's laboratories.

If the volume of work ever justifies it, laboratories may be built in some of the countries where there are now only offices. In addition, the Frankfurt and Geneva plants have plenty of room to expand because both are built on the metropolitan outskirts and are surrounded by a lot of acreage.

Battelle is looking to South America, too, and may eventually open an office or laboratory down there.

Direction—The whole European operation is under the direction of Dr. Frank Croxton, technical director in chemistry at Columbus. Gerry Keinath and Robert Keagy are business managers of the Frankfurt lab and the Geneva lab, respectively. Aside from these and two other Americans, the European staffs are all-European.

But the Battelle concept of team research and careful research management is being transplanted to Europe, points out Dr. Williams. "Europeans take enthusiastically to teamwork," he says. "The scientists over there are hard workers, ingenious and soundly grounded in the scientific fundamentals."

Recruiting — "We are having trouble recruiting enough good men," reports the Battelle president, "but good men are hard to find the world over." Dr. Williams has now made four trips to Europe on recruiting and other matters relating to organizing the subsidiaries.

"European industrialists, especially in Germany, are avid for research," he says. "Battelle has had magnificent receptions everywhere." He believes that's because most Europeans have seen for themselves, as the result of World War II, what applied research has done for America. While they are strong on fundamental science, many Europeans now admit they are weak in applying it to workaday industrial situations.

Handicaps—Handicapping the wider application of European research is a scarcity of capital. Therefore most Battelle projects thus far have been fairly simple. Language difficulties are also a barrier to a complete understanding of the problems. Dr. Williams and other Columbus officials review all jobs Battelle is asked to undertake abroad. What's more, Columbus has to bear in mind that economic and social conditions, which always influence the scope and direction of applied research, are much different in Europe than in America. The most pronounced difference is that in Europe labor is cheap, materials expensive—just the opposite of U. S. conditions.

"But those are all difficulties that will be solved somehow," said Dr. Williams. "What stirs me about European research is the enthusiasm there is for it. Many people abroad believe that Europe, like America, can get a new lease on economic life through research. The time is ripe now for expansive thinking and bold venturing."

PRODUCTION PROBLEM?

if you use flat-rolled steel talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

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DETROIT

DREAM cars could be a fairly sleep-disturbing matter for the auto companies.

Often sketched up only a few months in advance of new model introductions, these probes may hit engineers just at the time they're busiest with regular models for the following year. And with fiberglass the usual stuff Detroit dreams are made on, it's fairly uneconomical to waste stamping maestros' time dream car materializing.

Materializing the Dreams—A few auto companies do find the time and facilities to build their own dream cars either in fiberglass or metal. Other companies send models abroad to bodymakers like Ghia in Turin, Italy, whose craftsmanship is illustrated in such cars as the DeSoto Adventurer II. But when busy auto engineers are dreaming toward a deadline, appropriately-named Creative Industries of Detroit is a top candidate to make their dreams come true.

Working from full or fractional-size clay models, sketches or even gestures, Creative has probably put more dreams on wheels than anybody in the business. For obvious reasons the company does not wish to publicize which auto companies have been cheating in their dreams, but among customers are most major automakers. That's because Creative offers facilities comparatively unique in the engineering service field, facilities which can turn out a car complete with trim and ready to show starting with just an idea.

Creative Growth—Behind this organization, which was formed after the war as a wooden die model shop, is a remarkable picture of growth. New departments were added and the philosophy of the company was broadened until today the firm is equipped to take a raw idea, develop it into drawings and models and ultimately build a working prototype. The idea can be a dream car or a tricycle, but Creative's supermarket style of engineering service is equipped to handle it.

That's why Creative is a good prospect for dream car development, but that's only one of the colorful products of its operations. Another highly interesting job involved flared air-intake venturi bells for Allison jet engine test cells. With an interior diameter of 24 inches and several feet long, the bell was a job most engineers figured should be done in aluminum. The reason: The interior diameter tolerance was a niggardly plus or minus 0.002 inch on the thin-walled piece.

Touchy Job—When delivery time in aluminum appeared too long, Creative was called in, met the delivery dates and held the tolerances in fiberglass. To its knowledge, this is one of the touchiest jobs yet executed in the material and it was done at a cost considerably less than the part would have cost in aluminum.

The element of cost plays a big role in one of Creative's major tasks, building spotting racks and checking fixtures. Executed in fiberglass, these cost about one-fifth their price in steel, are just as strong and many times lighter. Use is growing at such a rate in the Motor City that the firm expects such units to be made almost exclusively of fiberglass within the next one or two years.

Making It Graphic—In addition to its sheet metal shop, wood working shop, plastics division and design facilities, Creative offers an unusual "graphic illustration" service. This division prepares perspective drawings, exploded views, process manuals, and parts and service catalogues. The so-called "graphic illustration" technique is an unusual approach which the company believes exceeds the exploded view or the cutaway view in clarity. That makes them readily understandable by purchasing,

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,154	684,843
June	585,000*	713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,274

Week Ended	1954	1953
May 29	148,774	125,868
June 5	119,688	134,879
June 12	139,312	167,095
June 19	141,878	170,357
June 26	141,713	173,702
July 3	132,000*	140,491

Source: Ward's Automotive Reports
* Estimated by STEEL.

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Out of the Dream Class

No "dream car of tomorrow" says Nash of its 1954 Nash-Healey LeMans hardtop sports car, just introduced. The low and racy import is powered by a 140-horsepower, 6-cylinder engine. Price f.o.b. coastal entry port: $5128.05

management and sales personnel as well as engineers. The firm also prepares assembly procedure drawings used in automotive plants across the country.

Working with ideas on the scope that Creative does requires the ultimate in security, not only with outsiders but often between two competitors who may both be customers with similar work going on simultaneously. Facilitating this is a special coding system through which jobs are identified outside the office only by number, with only a trusted handful of men knowing the actual job the numbers signify. For the same reason closed and locked doors are a common sight at Creative and an unusual amount of shipping is done in the wee hours on Sunday morning.

Unusual Shift—Advanced design work for one major manufacturer's sports car is being handled in a special department at Creative, thanks to the competence and extent of its personnel and facilities. The shifting of this entire job to an outside firm is unusual in engineering service annals.

It's the more unusual because Detroit is an engineering service town. The almost rhythmic peaks of work in auto engineering departments, coupled with the abundance of auto engineers perennially eager to go into business on their own, create an atmosphere that keeps vacant stores in constant demand. Although the need is great, the competition is greater and to survive in the situation is an achievement. But to grow and prosper as Creative Industries has done is noteworthy in Detroit—that place where dreams are fulfilled.

No Tubes for Packard

Tubeless tires are now standard equipment on all Packard models with conventional tires optional at no extra price. But with tubeless tires in fleet service giving lives of 70,000 miles without failure while the conventional tire will go flat once in every 19,000 miles of driving, there seems little doubt which way the pendulum will swing. In fact, several manufacturers are reported ready to swing to tubeless tires in 1955.

Duals for Mercs

Better economy, faster acceleration and higher top speed are cited as benefits for dual exhaust systems now being made available for Mercuries of 1954 vintage. The duals also reduce valve temperatures, to bring longer valve life, and boost somewhat the horsepower.

Why the switch now? Competition at the moment coupled with paving the way for stock duals on 1955 models seem reasonable guesses. Suggested list price is $49.50 plus dealer installation.

Car of the Week

We recently spent a week in a Colds 98, air-conditioned Olds that is. If you haven't driven an air-conditioned job in summer yet it would be a good idea not to—you'll want one. This is one of the greatest boons to mankind since the ocean breeze, though not quite as sensibly priced.

A Holiday model, this car included power steering, power brakes, power windows, power seat, power antenna, selectomatic radio and Hydra-Matic transmission. With everything but power button pushers, here is driving in its simplest form. The sensation is somehow like sitting on a davenport adjusting a TV picture.

But although the car accords the driver all the flattery due a teenager who has mastered the operation of a juke box, there was something almost awe inspiring the way a finger tip made things happen. And all this is to the credit of Oldsmobile though you may wonder if the next generation will have enough strength to swing a golf club.

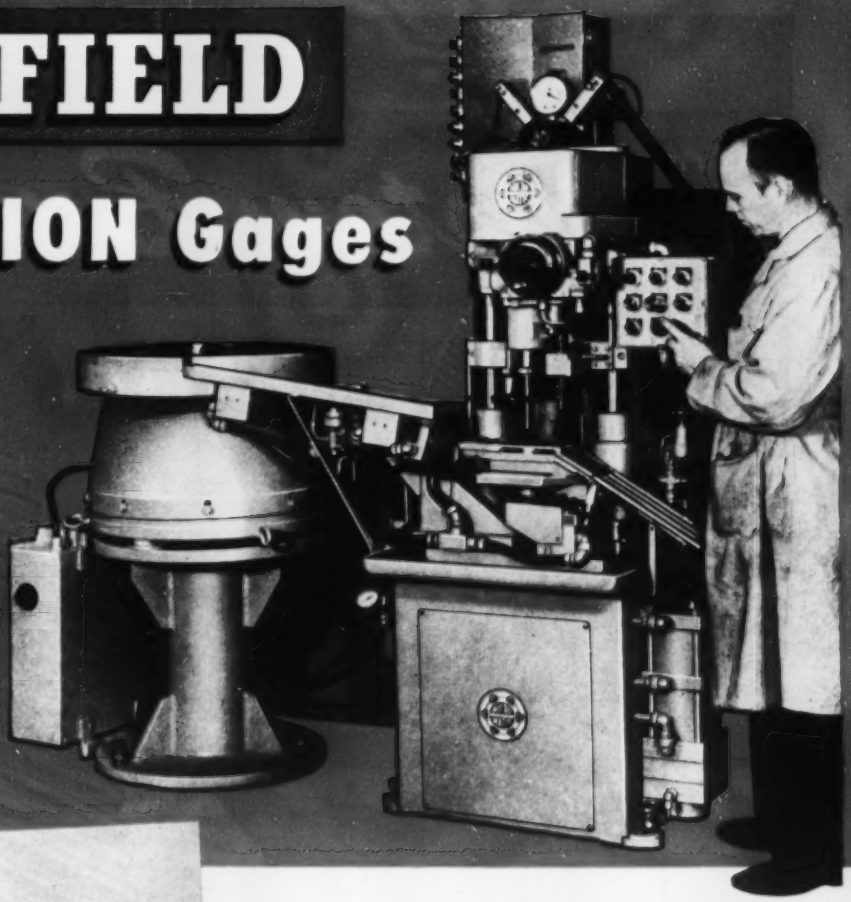
Underneath this electricians' playground was a very respectable chassis and suspension which handled rather well despite an 8.00 x 15 handicap on the four corners. Acceleration was good both at slower and higher speeds though kicking down seemed advisable for passing in normal driving situations. The car seemed a bit unstable at higher speeds initially, but the soft springing, once accustomed to, never left the car pointed in an untoward direction.

Seating was comfortable and ride excellent. With the windows up and the air conditioner operating gone are the annoying breezes and the need to shout in conversation or turn up the radio volume. It may be truly said that this car reaches new heights in insulating the driver from the environment outside his car. Whether in a moving object this insulation is desirable is another matter entirely.

SHEFFIELD

AUTOMATION Gages

Assure Fast Accurate Machining



Sheffield Automation Gages are package units, ready-to-use and economically priced, for the control of grinding, boring, drilling, honing, milling and turning operations.

Mounted on machine tools, they measure work part dimensions and space relationships and instantly translate this information into electrical impulses which in turn:

- **Energize signal lights**
- **Actuate solenoid ejection or classification mechanisms**
- **Start and stop the machine tool**
- **Provide feed-back control**
- **Control cutting tool or grinding wheel positioning and compensation, also time cycle.**

A Typical Application

Here the bore of transmission pinions is being honed and gaged automatically.

If the actual bore size, after honing, is within .0001" of either tolerance limit, white warning lights flash on.

If either tolerance is exceeded, a red or green signal flashes and the faulty part is automatically ejected.

When a predetermined number of rejects pass through in succession the machine is automatically stopped.

The actual size of each bore, as it is gaged can be read on a conveniently located air gage dial as built into the machine tool pneumatic circuit.

The Sheffield Corporation, Dayton 1, Ohio, U.S.A.

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

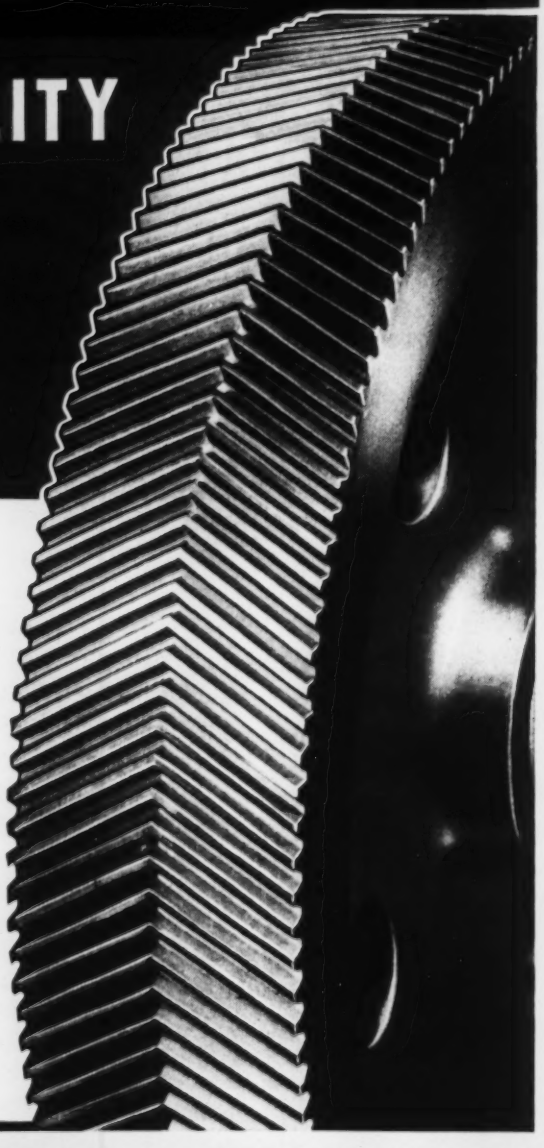
SHEFFIELD

Sheffield AUTOMATION ENGINEERS will gladly consult with you about automatizing your production.

6491

"Custom Built"

QUALITY



HERRINGBONE GEAR SPEED REDUCERS

Indicative of the well planned design features of Philadelphia Herringbone Reducers is the gear arrangement in the Double and Triple types. In these reduction units, the gears are located symmetrically with respect to the centerline of the housing, rather than the usual offset arrangement. Two standard bearings are provided on each shaft, with each bearing absorbing an equal load. The Philadelphia Gear arrangement allows the use of wide and stable housing, it eliminates the unequal bearing and thrust loads inherent in the off-set herringbone and single reduction reducers.

It is evident then, that Philadelphia Herringbone Reducers with high speed double helical gears spaced equidistant from the housing centerline in the first and intermediate reductions, and with a continuous tooth herringbone gear set on the centerline for final reduction, provide *perfect balance and symmetry*.

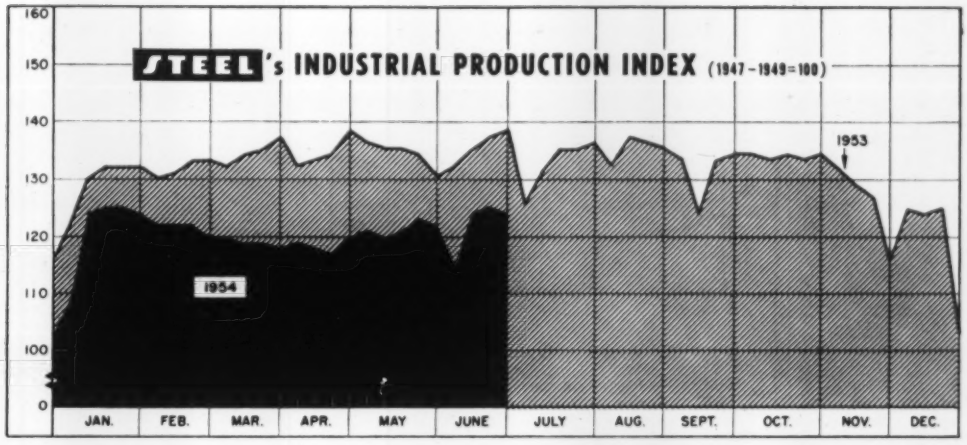
For complete construction details write for our catalog H-49.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears and Speed Reducers
LimiTorque Valve Controls



LATEST WEEK*	124
PREVIOUS WEEK	125
MONTH AGO	120
YEAR AGO	139

* Week ended June 26.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Things Are Getting Better

AS THE SECOND HALF gets under way, there is increasing optimism and talk of a fall upturn in business. Most barometers have been leveled off for a respectable period of time, giving added credence to the widespread opinion that the adjustment period is over.

Even the Commerce department's Office of Business Economics, which surveys more barometers than a TV weatherman, indicates this when it says in the June issue of "Survey of Current Business" that business "continues to be characterized by mixed trends, with most industries following usual seasonal patterns." Key here is the latter portion, because if the adjustment were still in progress, the "usual seasonal patterns" probably would not be happening at all. When it comes right down to it, things *are* getting better, not because they can't get worse, but simply because the economic system is snapping back to a normal peacetime pace.

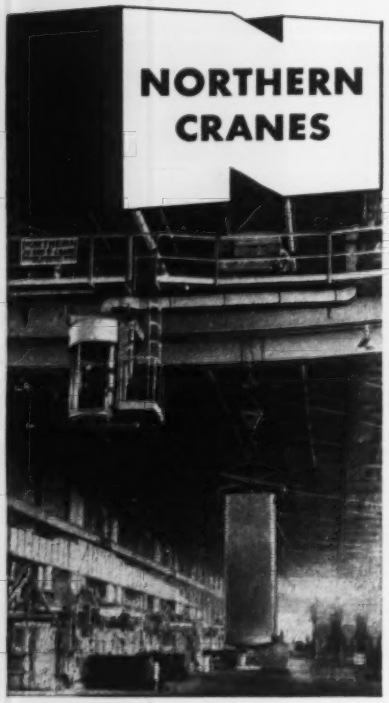
Fortification—Members of the National Association of Purchasing Agents fortify this contention in their June reports on general business conditions. They say that the leveling off and improvement started in March is continuing unabated into June. Even with vacations cutting into plant activity, these men believe third quarter will continue to show a gradual upturn. Some of the new orders now showing up, they feel, are intended to cover requirements while suppliers are on vacation.

Purchasing agents also report more stability in the labor market with 75 per cent reporting the same employment as the previous month. In May, only 53 per cent could make that statement. However, students entering the market for the short term are causing some swelling of the unemployment figures. In addition, the PAs have decided their May report of stabilizing inventories may have been wrong. Now they see inven-

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,597	1,720	2,069
Electric Power Distributed (million kwhr)	8,650[1]	8,850	8,446
Bitum. Coal Output (daily av.—1000 tons)	1,328	1,260	1,616
Petroleum Production (daily av.—1000 bbl).	6,450[1]	6,495	6,484
Construction Volume (ENR—millions)	$312.9	$317.9	$484.4
Automobile, Truck Output (Ward's—units)	141,713	140,063	173,702
TRADE			
Freight Car Loadings (unit—1000 cars)	710[1]	707	818
Business Failures (Dun & Bradstreet, no.)	213[1]	207	131
Currency in Circulation (millions)[3]	$29,735	$29,803	$29,929
Dept. Store Sales (changes from year ago)[3]	+4%	−1%	+13%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,686	$19,529	$19,008
Federal Gross Debt (billions)	$271.2	$273.1	$265.4
Bond Volume, NYSE (millions)	$18.8	$16.3	$14.1
Stocks Sales, NYSE (thousands of shares)	10,324	8,515	5,121
Loans and Investments (billions)[4]	$81.7	$80.2	$76.6
U. S. Gov't. Obligations Held (billions)[4]	$34.1	$33.2	$29.5
PRICES			
STEEL's Finished Steel Price Index[5]	189.75	189.75	189.18
STEEL's Nonferrous Metal Price Index[6]	214.8	214.1	211.3
All Commodities[7]	109.9	110.0	109.6
Commodities Other Than Farm & Foods[7]	114.4	114.4	114.0

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



. . . serve a large primary metals plant

NORTHERN OVERHEAD TRAVELING ELECTRIC CRANES provide the fast, safe, dependable heavy duty service required for handling heavy, bulky materials in modern metal producing plants. They are designed with ample provision for emergency overloading and safety, — for minimum downtime.

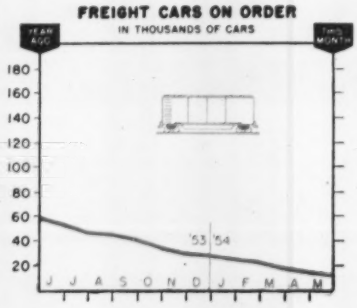
The crane shown above is only one of the more than 700 NORTHERN CRANES which have been installed in the many plants of one large metal producing corporation. This is gratifying evidence of dependable service and value which have been maintained through the years in NORTHERN CRANES.

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

NORTHERN CRANES

THE BUSINESS TREND

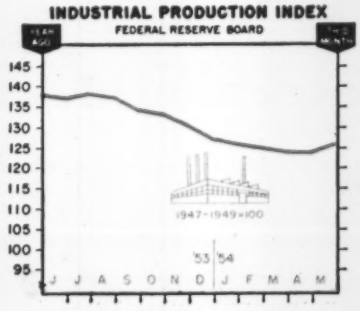
FREIGHT CARS ON ORDER
IN THOUSANDS OF CARS



	Awards 1954	Awards 1953	Backlogs (end of month) 1954	Backlogs (end of month) 1953
Jan.	2,942	7,406	27,959	77,414
Feb.	2,057	2,284	27,441	71,882
Mar.	348	3,247	20,966	68,553
Apr.	909	2,102	17,817	62,637
May	1,071	1,645	15,615	57,345
June	.....	1,453	.....	52,315
July	.....	1,671	.....	47,423
Aug.	.....	3,913	.....	45,735
Sept.	.....	3,867	.....	42,198
Oct.	.....	1,705	.....	35,171
Nov.	.....	2,858	.....	31,869
Dec.	.....	2,159	.....	29,950
Total	.....	34,310		

American Railway Car Institute.

INDUSTRIAL PRODUCTION INDEX
FEDERAL RESERVE BOARD



(seasonally adjusted)

	Total Production 1954	Total Production 1953	Primary Metals 1954	Primary Metals 1953	Metal Fabricating 1954	Metal Fabricating 1953
Jan.	125	134	111	135	155	168
Feb.	124	134	108	137	152	168
Mar.	123	135	103	136	148	168
Apr.	123	136	104	136	146	169
May	125*	137	106	139	147	169
June	...	136	...	137	...	168
July	...	137	...	136	...	171
Aug.	...	136	...	137	...	171
Sept.	...	133	...	130	...	166
Oct.	...	132	...	128	...	165
Nov.	...	129	...	122	...	159
Dec.	...	126	...	113	...	156
Avg.	...	134	...	132	...	167

* Preliminary Federal Reserve Board.

tory reduction continuing at about the same rate as earlier in the year.

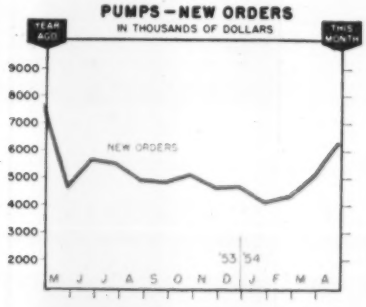
More Evidence — STEEL's own industrial production index gives the optimists ammunition. Its general direction has been up since latter April until it equaled the 1954 peak of 125 during the week of June 19, then settled back a point for the preliminary reading of June 26. After three weeks in a row hovering around the year's high mark the index is bound to take a plunge for at least the next two weeks, reflecting the long Fourth of July week end, which will start after the late shift on July 2 for many companies. But that happens nearly every year and should cause no extra worry.

Gimmicks Pay Off . . .

One good reason for the continuing undertone of satisfaction with the way business is turning out is the really tremendous surge the automakers are making to sell their chariots. They finally seem to realize that people still want new cars—and old ones—but that the buyers have to be sold first. Almost every major producer has pulled out the stops on dealer contests and gimmicks, and the results may wind up in a near-record sales figure for June. If the sales rate of the first ten days of the month holds, the total could be as high as 530,000 new units, compared with 519,000 for June, 1953, says *Ward's Automotive Reports*. That in turn could prompt automakers to revise their factory schedules upward, even though most experts were agreed that the production surge for this year was over in May. Meanwhile, used-car sales kept pace with the shinier models during May when sales increased an average of 2.3 per cent over May, 1953, according to *Ward's*.

Central Industrial Rebounds . . .

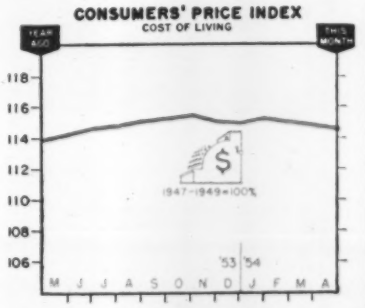
Not to be outdone, electric power took its share of the spotlight with 8850 million kilowatt-hours distributed during the week ended June 19, says Edison Electric Institute. That was 6.3 per cent better than year-ago output and even topped the previous week's reading, which was the highest since mid-February. One reason for the continued strong showing of this indicator is the return to the plus column of the important central industrial district. Most of the year this section has run



In Thousands of Dollars*

	1954	1953	1952
Jan.	4,057	5,752	5,517
Feb.	4,272	6,521	6,020
Mar.	5,093	8,256	5,925
Apr.	6,283	7,758	6,354
May	....	4,629	6,140
June	....	5,690	7,957
July	....	5,533	6,299
Aug.	....	4,886	5,921
Sept.	....	4,845	5,258
Oct.	....	5,097	5,534
Nov.	....	4,634	4,130
Dec.	....	4,645	6,575
Total	....	68,245	71,630

* 32 companies. Hydraulic Institute.



	1954	1953	1952
Jan.	115.2	113.9	113.1
Feb.	115.0	113.4	112.4
Mar.	114.8	113.6	112.4
Apr.	114.6	113.7	112.9
May	....	114.0	113.0
June	....	114.5	113.4
July	....	114.7	114.1
Aug.	....	115.0	114.3
Sept.	....	115.2	114.1
Oct.	....	115.4	114.2
Nov.	....	115.0	114.3
Dec.	....	114.9	114.1

U. S. Bureau of Labor Statistics.

behind year-ago figures by as much as 5 and 6 per cent. During the week of June 19 it was almost 1 per cent over the same 1953 week.

Steel Bows to Holiday . . .

Steel operations, after hovering over the 70-per-cent mark for seven weeks in a row took a holiday dip to around 67 per cent of capacity for the week beginning June 28, American Iron & Steel Institute estimates. How much of a recovery the industry makes depends, among other things, upon the summer vacations, which usually start in earnest after the Fourth.

Retailers Feel Better . . .

Retailers, too, are beginning to feel better about the second half as their sales respond to the warm weather and some rather warm competitive gimmicks. New York department stores report a sales increase of 6 per cent for the week ended June 26, compared with the same week last year, largely the results of the "summer festival" promotion. Both Dun & Bradstreet Inc. and the Federal Reserve Board report retail sales holding up well for the past couple of weeks.

Loadings Still Climb . . .

Freight car loading for revenue, although still running behind 1953 totals, set a new 1954 high of 707,208 cars for the week ended June 19, Association of American Railroads reports. That is 1.4 per cent above the previous week. AAR expects revenue car loadings in third quarter to be only about 8 per cent under third quarter last year.

Peacetime Troubles . . .

But machine tools are still having their troubles making a go of it in peacetime, compared with the plush times of even a year ago. New orders for May were only 139.9 per cent of the 1945-1947 average, the lowest level since June, 1950. Deliveries, at 268.6 of the same base period, have cut backlogs down to 3.8 months. But even with this situation, some producers are looking at the brighter side. Says one: "We know it isn't as good as we've been used to over the past four years, but after all, it's entirely civilian business . . . and as such, probably the best level of purely civilian business we've ever known."

Which kind of Cold Rolled Strip Steel is best for You ?

CONSIDER SHEET COIL

—if variations in physical characteristics are permissible.
—if fairly heavy oversize gauge variations are not objectionable.
—if the fabricating operations are not too complicated and do not require intricate expensive dies.
—if a fine surface finish is not essential.
—if a good base for paint or enamel is desired.
—if you do not object to some "square footage" loss due to oversize variation.
—then Sheet Coil will probably be the most economical material for the job.

CONSIDER THINSTEEL

—if you must have a high degree of uniformity of chemistry and physical properties—and precision gauge tolerances.
—if you wish to keep die wear low, no oversize gauge variations.
—if you require a fine finish or a better base for plating.
—if you want maximum yield for "most finished parts per ton."
—if you want selected tempers for maximum strength and lightest weight.
—then you'll find Thinsteel the most economical material by far.

You can always count on Kenilworth helping you get the right steel for your requirements. Order Sheet Coil or Thinsteel and notice that each coil carries an identifying tag as pictured above. Call on Kenilworth, too, for your needs in Stainless Sheets or flat rolled Spring Steels (Annealed or hardened and tempered).

THE Kenilworth Steel co.

750 BOULEVARD,
KENILWORTH, NEW JERSEY

SPECIALISTS IN FLAT ROLLED METAL PRODUCTS

Telephones: N. Y. COrtlandt 7-2427
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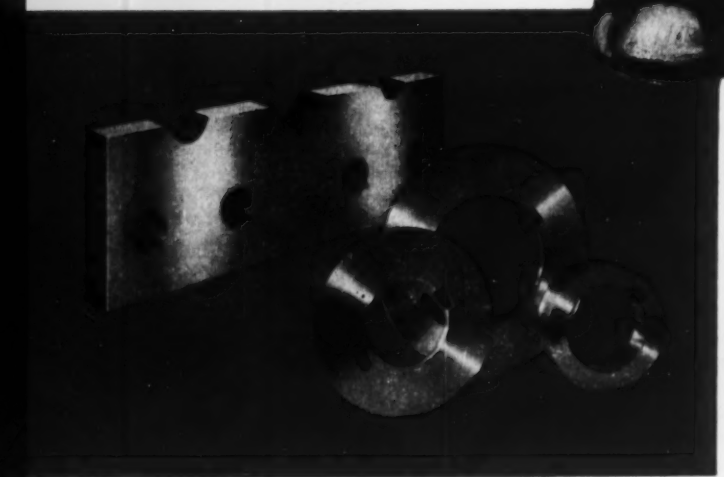
Teletype: Roselle, N. J., 387

built for

rugged action

Heppenstall
SHEAR KNIVES
***durable blades* for industry**



Many leading plants make Heppenstall their standard specification for shear knives. Heppenstall's record for durability provides such production advantages as:

- **MORE CUTS BETWEEN GRINDS**
- **MORE UNITS PER BLADE**
- **LOWER OVERALL BLADE COST**
- **INCREASES IN PRODUCTION**

The reasons may be found in Heppenstall's high standards for the development and manufacture of shear knives. Made from high quality, electric induction steels, these long-lasting knives are famous wherever hot and cold, ferrous and non-ferrous metals are cut and sheared.

Make Heppenstall *your* standard specifications.

Heppenstall

The most dependable name in forgings

PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

CHARLES L. JACOBSON
. . . executive head of Chrysler sales

Charles L. Jacobson relinquishes the presidency of Chrysler Motor Parts Division to assume new duties as executive in charge of sales activities for **Chrysler Corp.**, Detroit. **A. vanderZee,** director and vice president of the corporation, and vice president-sales since 1938, will concentrate in a general executive capacity on various phases of Chrysler's sales development program.

Eaton Mfg. Co. appointed **J. C. Sprague** engineering manager and **H. M. Reigner** sales manager of its newly created aircraft division, Battle Creek, Mich. At its dynamatic division at Kenosha, Wis., **G. E. Walk** was made sales manager, and in addition **Frank White** was named Chicago district sales manager and **T. R. LaVallee** Detroit district sales manager.

G. S. Blakeslee & Co., Chicago, appointed **A. L. Bashe** sales manager to replace **Jack Arnold,** now chief of the engineering department and new development section.

Milton J. Steffes, former sales manager, was promoted to chief engineer, **Super Tool Co.**, Detroit, in charge of all design, field engineering development and new product engineering. **Kenneth R. Fisher** is now sales manager and **Louis B. Szal** was promoted to works manager.

STUART N. SMITH
. . . Twin Coach aircraft div. works mgr.

Stuart N. Smith fills the newly created position of works manager at **Twin Coach Co.'s** Buffalo Aircraft Division. **John J. Lee,** recently elected executive vice president at Twin Coach, continues in charge of the aircraft division but divides his time between the Buffalo and Kent, O., plants. Mr. Smith formerly was director of manufacturing at Buffalo.

Brown & Sharpe Mfg. Co., Providence, R. I., formed additional divisions at its Promenade street plant and named **A. Dean Hunter** superintendent, screw machine division, **Frank E. Manchester** superintendent, central services division and **Frank A. Benoit Jr.** superintendent, foundry division. These new divisions are in addition to the precision tool and gage division created two years ago, and the metal cutting tool division created several weeks ago.

Kaiser Steel Corp., Oakland, Calif., named **C. Lee Emerson** general sales manager and **Jack J. Carlson** assistant to the vice president and general manager.

Theodore S. Nagel was elected to the newly created position of vice president in charge of sales of **Barcalo Mfg. Co.**, Buffalo.

Paul F. Pardonner was made assistant manager, Detroit sales district, **Armco Steel Corp.**

S. H. NEWBURN
. . . heads Air Reduction Canada Ltd.

S. H. Newburn was elected president of **Air Reduction Canada Ltd.**, Montreal, subsidiary of Air Reduction Co. Inc. He joined Air Reduction in 1936. In 1950 he became regional manager of the north central region of Air Reduction Sales Co. at Chicago where he is succeeded by **D. F. McCandlish,** former Chicago district manager.

J. E. M. Wilson, vice president and manager, mining division, **Jeffrey Mfg. Co.**, Columbus, O., was elected vice president in charge of sales. **A. R. Anderson** was made general sales manager, mining division, **Lincoln Kilbourne** general manager of sales, conveyor division and **J. B. McNaughton** general manager-sales for the special products division.

Howard Mortensen, assistant production manager, was promoted to works manager of **Lakeside Bridge & Steel Co.**, Milwaukee.

Franklin H. Drew was made Pacific Coast service manager for **Westinghouse Electric Corp.** He has headquarters in San Francisco. **J. N. Jones,** electrical superintendent on the Pacific Coast, was made engineering and service manager for the Salt Lake City, Utah, office to replace **E. H. Hulse** who transferred to East Pittsburgh, Pa., as mining, petroleum and chemical section manager in the

JOHN L. HALLETT

PAUL C. MEYER

. . . new vice presidents of Kaiser Metal Products

Westinghouse industry engineering department.

Kaiser Metal Products Inc., Bristol, Pa., elected **John L. Hallett** vice president in charge of aircraft production and **Paul C. Meyer** vice president-administration. Both have had extensive service in various organizations managed by Henry J. Kaiser. In 1946 Mr. Hallett went to Kaiser Motors Corp. (then Kaiser-Frazer) and served as executive vice president. He transferred to Kaiser Metal Products last year. Mr. Meyer joined KMP in 1952. He was executive assistant to S. D. Hackley, vice president-general manager.

Jack G. Allen was elected president, general manager and a director of **Artisan Metal Works Co.**, Cleveland. He most recently served as vice president-general sales manager of Bingham-Herbrand Corp.

Owen P. Langworthy is the new general manager of **Raymac Mfg. Co.**, Detroit, taking over duties of **L. A. Whitmore** who is on leave of absence.

J. J. Scheckelhoff is general manager of the Dayton, O., branch manufacturing plant of **William S. Scull Co.**

Forwood C. Wiser, formerly assistant to the executive vice president of Container Corp. of America, joined **Pittsburgh Standard Conduit Co.** as assistant to the president. He is located at the firm's main offices in Etna, Pa.

Harry B. Matzen Jr., effective July 1, succeeded **R. K. Newman** as superintendent of the East Hartford, Conn., plant of Republic Steel Corp.'s **Union Drawn Steel Division.** Mr. Newman, with Republic and predecessor companies for 40 years, will retire at the end of the year. Mr. Matzen has been assistant superintendent of the Massillon, O., plant since 1952.

Timken Roller Bearing Co., Canton, O., promoted **Herchel M. Richey** to general factory manager and **Henry A. Tobey** to factory manager, Canton and Gambrinus, O., bearing factories. Mr. Richey formerly was factory manager of the bearing and rock bit divisions. Mr. Tobey was general superintendent of the Canton bearing division and is replaced by **Wilbur L. Young**, former assistant chief inspector.

Youngstown Sheet & Tube Co., Youngstown, promoted **John P. DeHetre** from manager of oil country tubular sales to assistant general manager of sales. He is succeeded by **Charles T. McClure**, former assistant manager. **Robert E. Hawley** was made manager of line pipe sales.

Ellison L. Hazard was named general manager of the north-eastern district of **Continental Can Co.'s** eastern metal division, and Thomas **G. Simota** was named manager of the metal can plant in Milwaukee.

Frank H. Pfefferle, sales manager, **Cincinnati Shaper Co.**, Cincinnati, was promoted to special projects manager. He is succeeded as sales manager by **Alfred Baumgartner. Joseph Warren** was appointed advertising manager. Mr. Pfefferle's new duties involve special work primarily in the fields of new product development and market research.

Lee J. Doyle, former project engineer, was made secretary of **In-**

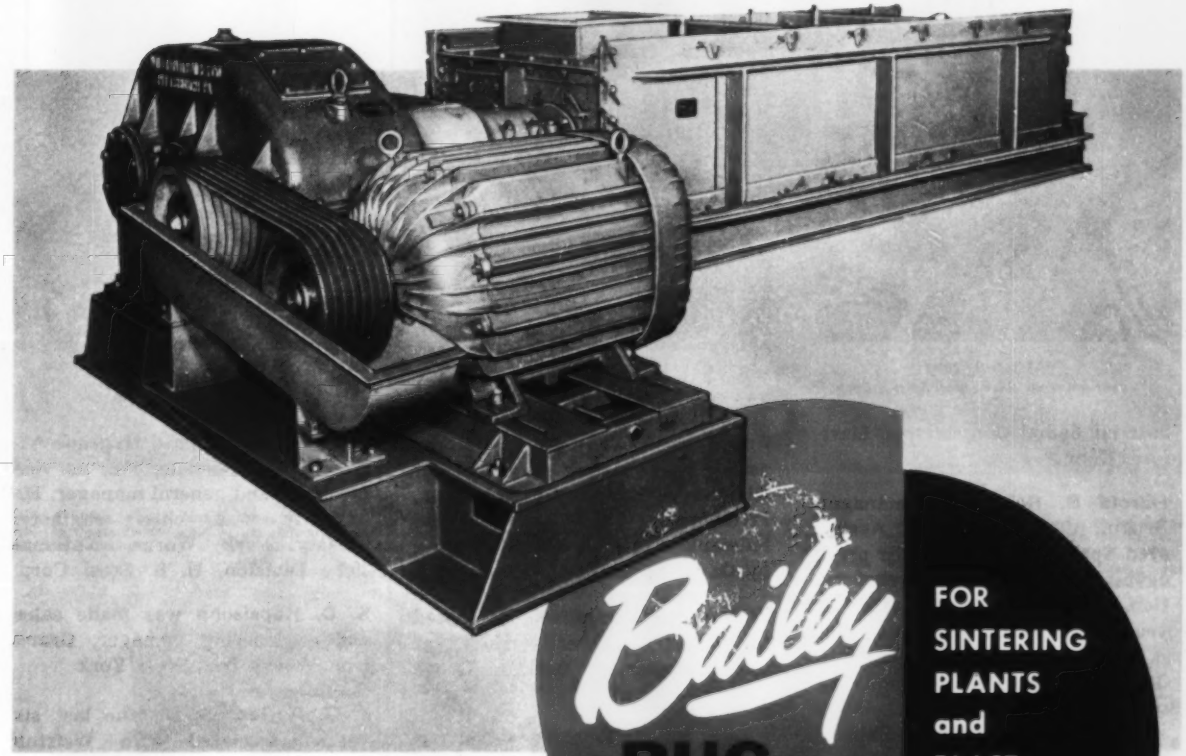
HERCHEL M. RICHEY

HENRY A. TOBEY

. . . promotions at Timken Roller Bearing Co.

GREATER TONNAGE

OF BETTER GRADE SINTERED PRODUCTS



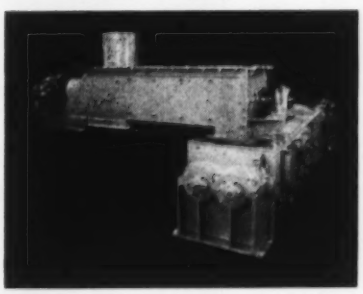
Bailey PUG MILLS

FOR SINTERING PLANTS and BLAST FURNACE DUST CATCHERS

BAILEY FEEDER

Improves

Pug Mill Operations



Adaptable to all Bailey Pug Mills, the Bailey Feeder speeds the sintering process and makes possible substantial cost savings through the reduction of hand labor. The unit is operated by a motor-driven screw-type conveyor.

These mills are the means to increased tonnage and a more uniform grade of sintered product. They are ruggedly built to provide continuous, low-cost service under severe operating conditions, and the design is such that a higher bed can be used without increasing wind box vacuum. Made in the capacity you require, they are available in single and double shaft models with either direct or rope drive.

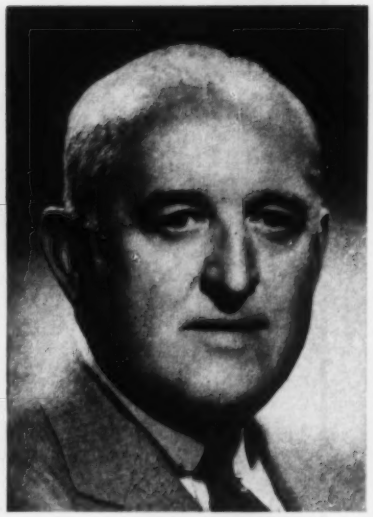
WILLIAM M. **Bailey** COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

HAROLD B. REID
. . . retires from Associated Spring Corp.



FRANK W. LADKY
. . . asst. to president at Allegheny-Ludlum

D. J. BRANNING
. . . joins Hygrade-Atlas Inc.

dustrial Sound Control Inc., Hartford, Conn.

Harold B. Reid, sales manager, Bristol, Conn., Divisions, **Associated Spring Corp.,** and vice president and director of the corporation, retired last week after 35 years of service. He is succeeded as sales manager by **Jefferson S. Gamble. Joseph T. Domingue** replaced Mr. Gamble as assistant sales manager in charge of spring sales at Bristol.

Austin E. Fribance was appointed chief engineer, **Rochester Mfg. Co.,** Rochester, N. Y. He was with Western Electric Co.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., appointed **Scott S. Walker** manager, distributors, in charge of aluminum products marketed through industrial contract distributors and jobbers. He replaces **R. G. Welch,** resigned to become executive secretary of American Steel Warehouse Association.

Frank W. Ladky was appointed assistant to the president of **Allegheny Ludlum Steel Corp.,** Pittsburgh. He is succeeded as Milwaukee district sales manager by **David L. Garlick.**

William E. Eccles was promoted to foundry superintendent of **Cooper-Bessemer Corp.'s** Grove City, Pa., plant.

Frank K. McDanel, president of U. S. Steel Corp.'s **American Bridge Division,** Pittsburgh, has retired after 50 years of service with the corporation.

Herbert J. Reid was made factory manager of the Ft. Wayne, Ind., plant of **United States Rubber Co.'s** mechanical goods division. He succeeds **H. Leon Moran,** named new products manager for the division.

W. H. Pender was made manager, belting sales, **Quaker Rubber Corp.,** division of H. K. Porter Co. Inc., Philadelphia.

D. J. Branning joined **Hygrade-Atlas Inc.,** Carbondale, Pa., as vice president and general manager. He formerly was chief engineer, Christy Park Works, National Tube Division, U. S. Steel Corp.

S. D. Kapelsohn was made sales and engineering manager, **Grand Iron Works Inc.,** New York.

J. G. McDonnell, for the last six years associated with Weirton Steel Co., joined **S. P. Kinney Engineers Inc.,** Carnegie, Pa., to serve in an engineering and sales capacity.

Homestead Valve Mfg. Co., Coraopolis, Pa., appointed **Fred Schuchman** assistant general sales manager for all divisions. He was sales manager, Hypressure Jenny Division.

O. H. Yoxsimer was appointed manager of refrigeration engineering at the new **Westinghouse Electric Corp.** appliance division plant in Columbus, O.

OBITUARIES . . .

Rawson Vaile, 67, executive vice president and a director of **American Blower Corp.,** Dearborn, Mich., died June 19.

Bert F. Downey, 70, secretary-treasurer and general manager, **Yost Superior Co.,** Springfield, O., died June 16.

Harry Miller, 69, president, **Miller Brass Fittings Co.,** Brooklyn, N. Y. died June 23.

Walter J. Tyler, 68, vice president and chief engineer, **H. J. Brandeles Corp.,** Utica, N. Y., died June 17.

C. F. Stengel, 74, a buyer in the purchasing department of **Bethlehem Steel Co.,** died in Buffalo June 16.

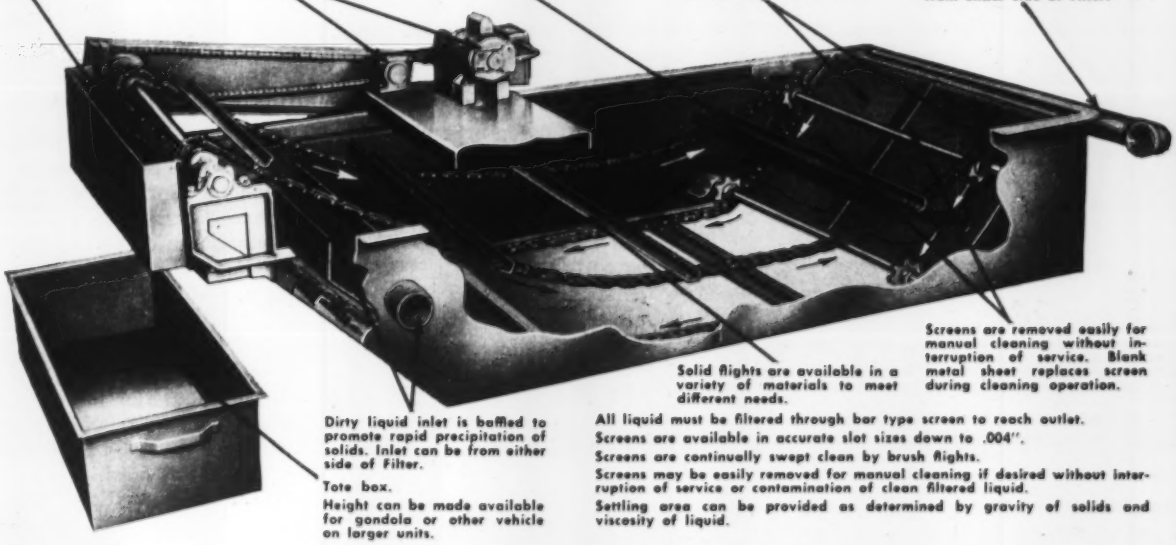
H. E. Nelson, 62, vice president, **Elgin Tool Works Inc.,** Chicago, died June. 20.

Leon H. Johnson, 69, chief engineer, Warren, Pa., division, **Struthers Wells Corp.,** died June 8.

Charles W. Kinsner, 68, superintendent, **Cleveland Precision Ring & Products Co.,** Cleveland, died June 26.

Another New Delpark Development

Delpark Settling and Filter


Special cleaning device (not shown) removes solids from flights prior to return.
Motor drive is through separate reduction gears. May be mounted on either side as desired.
Screen is continuously swept clean with specially constructed brush flights.
To reach outlet all liquid must pass through bar type screen with accurately sized slots. Screens available with slots down to .004" in size.
Clean liquid outlet following flow through bar type, continuously cleaned screen.
Clean liquid discharge can be from either side of Filter.
Screens are removed easily for manual cleaning without interruption of service. Blank metal sheet replaces screen during cleaning operation.
Solid flights are available in a variety of materials to meet different needs.
Dirty liquid inlet is baffled to promote rapid precipitation of solids. Inlet can be from either side of Filter.
Tote box.
Height can be made available for gondola or other vehicle on larger units.

All liquid must be filtered through bar type screen to reach outlet.
Screens are available in accurate slot sizes down to .004".
Screens are continually swept clean by brush flights.
Screens may be easily removed for manual cleaning if desired without interruption of service or contamination of clean filtered liquid.
Settling area can be provided as determined by gravity of solids and viscosity of liquid.

The DELPARK Settling and Filter System is engineered for the filtration of particles .004" or larger. It is made for the filtration of liquids of varying degrees of viscosity containing solids of different particle sizes and widely differing weights. Size of the equipment is dependent upon the settling rate which in turn is governed by the gravity of the solids and the viscosity of the liquid. This factor determines the retention period for a given rate of flow.

Write today for more information on this newest development in DELPARK Industrial Filtration.

Delpark INDUSTRIAL FILTRATION

BACKED BY MORE THAN 30 YEARS EXPERIENCE IN INDUSTRIAL FILTRATION

Reynolds Expanding Mill

Melting, holding and annealing furnaces will be installed at Sheffield, Ala., sheet plant

REYNOLDS METALS CO., Louisville, will expand and modernize the aluminum sheet mill facilities operated by its subsidiary, Reynolds Alloys Co., at Sheffield, Ala. The $2,585,000 program includes new furnaces and new buildings to house them.

First step in the program is installation of eight melting and holding furnaces in the melting and alloying department. Each melting unit will have a capacity of 60,000 lb, while each holding furnace will have a capacity of 40,000 lb. Being installed with these furnaces are direct chill casting units with modern controls and equipment. New melting equipment will have a capacity of about 90 million pounds per year.

Annealing Units—Also to be installed are four new annealing furnaces, each accommodating up to 120,000 lb of aluminum coils on trays measuring about 12 ft wide by 40 ft long. Furnaces are gas-fired, radiant tube type which do not allow combustion gases to come in contact with the aluminum coils. The furnaces are air tight, allowing the metal to be annealed under a neutral atmosphere and permitting production of a brighter product.

Cooling equipment required in the production of hard alloys is incorporated in the design of these annealing furnaces. Temperatures are controlled by electronic pyrometric instruments. These double-end furnaces will require construction of new buildings for housing them, and installation of the necessary cranes and car movers for handling the large trays.

Installation of the furnaces, their accessory equipment, and construction of the buildings is the first phase of the expansion and modernization program at the Sheffield plant.

Boiler Firms Unite

Canadian interests of John Thompson of Wolverhampton, England, have amalgamated with E. Leonard & Sons Ltd. of London, Ont., to form a Canadian firm to be known as John Thompson-Leonard Ltd.

Located in Toronto, Ont., the new firm will manufacture steam boilers.

Pittsburgh Steel Operating New Annealing Furnaces

Warren, O., plant of Thomas Strip Division, Pittsburgh Steel Co., Pittsburgh, has placed in operation a new annealing furnace and two additional furnace bases. The Lee Wilson gas-fired radiant-tube-type circular furnace, which can be moved from base to base, is one of a battery of three portable furnaces in the plant. Above, one furnace is almost hidden in the background. Between the two plant. Above, one furnace is almost hidden in the background. Between the two, left and right, can be seen an inner cover. Convector plates are piled in front

Sheffield Is Armco Division

Sheffield Steel Corp., Kansas City, Mo., a wholly owned subsidiary of Armco Steel Corp., Middletown, O., was consolidated with the parent firm effective as of June 30. It is now known as Sheffield Steel, Division of Armco Steel Corp. Sheffield has an annual ingot capacity of 1.7 million tons, or about 35 per cent of Armco's total ingot capacity. It operates steel producing plants at Kansas City, Houston, and Sand Springs, Okla. Sheffield Steel recently acquired Southwest Steel Products at Houston, manufacturer of bar joists, concrete forms, and other fabricated steel products. Southwest Steel will build another fabricating plant in New Orleans.

West Coast Firm Expanding

Consolidated Engineering Corp., Pasadena, Calif., manufacturer of data processing and other engineering instruments, added a 40,000-sq-ft building to its main plant at 300 Sierra Madre Ave., that city.

Billard Buys Early Foundry

Anthony Billard, head of Billard Machine Tool Co., Mansfield, Pa., purchased Early Foundry Co.'s plant in Dickson City, Pa. He plans to establish a new industry in his own name.

Electroplater Enlarges Plant

Work has begun on an addition to Industrial Service Corp.'s building in Elmira, N. Y. The addition will permit the electroplating and metal finishing concern to expand its operations and take care of increased business, says G. P. Zurenda, president.

Instrumentmaker Builds Plant

Trans-Sonics Inc., Bedford, Mass., manufacturer of electronic and electrical instruments, is building a plant at Burlington, Mass.

Gets Wind Tunnel Contract

North American Aviation Inc., Los Angeles, will construct a $4.5-million supersonic wind tunnel at the Los Angeles International Air-

port. Structural sections will be designed by Pittsburgh-DesMoines Steel Co., Pittsburgh.

Carrier To Boost Production

Carrier Corp., Syracuse, N. Y., will improve and rearrange its facilities in that city to make possible a 75-per-cent increase in production of room air conditioners and to meet increasing demands for heavier air-conditioning equipment. The corporation expects to embark upon another major building program in 1955 and plans for this are under way.

Small Motor Output To Rise

Westinghouse Electric Corp., Pittsburgh, plans to expand its Small Motor Division operation by constructing a plant at Upper Sandusky, O. Production is expected to get under way in the 60,000-sq-ft plant some time in 1955 after installation of special equipment. Cost of the building and equipment is estimated in excess of $1 million.

SPO Inc. Enlarges Plant

SPO Inc. is adding 7200 sq ft of manufacturing space to its plant at 7500 Grand Division Ave., Cleveland. The firm makes a fully automatic molding unit as well as other foundry equipment.

Bullard To Build Foundry

Bullard Co., Bridgeport, Conn., machine tool manufacturer, plans to construct a $6-million foundry in Fairfield, Conn. Officials expect to have the new facility in operation by the latter part of 1955.

Buys J. C. Miller Co.

Physical assets, good will and organization of J. C. Miller Co., Grand Rapids, Mich., were transferred to Hanson-Van Winkle-Munning Co., Matawan, N. J. The Miller firm makes buffing compositions for the metal finishing industry, while H-VW-M manufactures electroplating and polishing equipment and supplies. G. H. Walgren, president of J. C. Miller, will continue to direct operations of the Miller organization.

McLouth Expanding Strip Mill

McLouth Steel Corp., Detroit, awarded a contract to Lee Wilson Engineering Co. Inc., Cleveland, for a large annealing installation in its cold strip mill at Trenton, Mich. The 24 single-stack furnaces, together with 60 bases, will give McLouth an annealing capacity of 40,000 tons per month of low-carbon strip steel in widths up to 52 in. The installation will cost about $1 million and will be completed in about eight months.

Laclede Builds in Memphis

Laclede Steel Co., St. Louis, is erecting a warehouse and fabricating plant in Memphis, Tenn. Charles S. Rogers is manager of southern sales. The new facility will cost about $300,000. The Memphis plant will handle reinforcing bars, wire mesh and building and highway accessories.

Pickard Offers New Service

James K. Pickard has opened a consulting practice in atomic energy developments following his resignation from U. S. Atomic Energy Commission, Washington. He has established headquarters at 1518 K St. N.W., Washington, as successor to F. H. Warren who recently joined the General Dynamics Corp. organization.

Adolph Plating Buys Firm

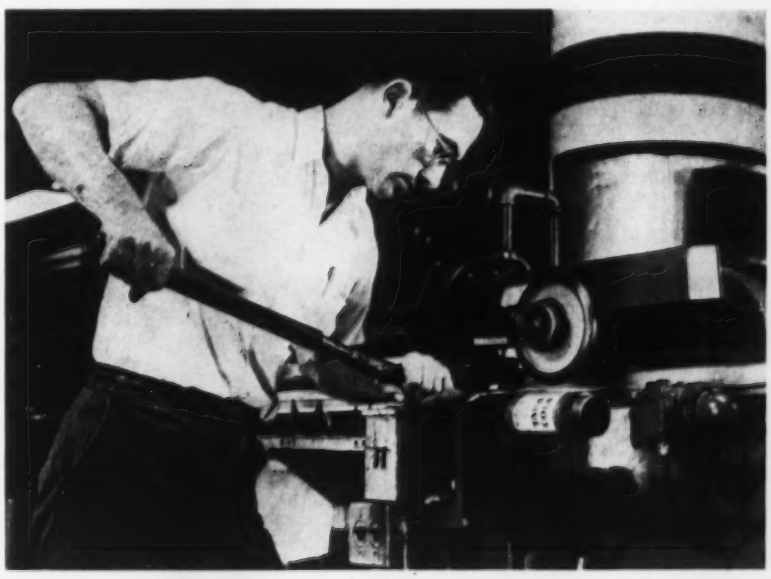
Adolph Plating Inc., Chicago, acquired Advance Tinning Co., that city, engaged in the hot-dip tinning business. R. L. Giesel is president of the plating firm.

Blackmer To Cast Meehanite

Meehanite Metal Corp., New Rochelle, N. Y., closed a contract with Blackmer Pump Co., Grand Rapids, Mich. The latter company will produce Meehanite castings for use as component parts in its line of industrial pumps.

Boosts Aluminum Ingot Capacity

Aluminum Co. of America, Pittsburgh, is undertaking a $175,000 ingot casting expansion program at its Wenatchee, Wash., plant. An oil-fired holding furnace, an ingot machine capable of casting 20,000 lb of aluminum per hour, fuel oil storage and pumping plant will constitute the new facilities. The equipment will be ready for op-



American Can Perfects Flat-Top Soft Drink Container

At intervals, as cans flow off this bodymaking machine (right foreground) at speeds up to 450 cans per minute, side seam tests are made. This machine operator at the Jersey City, N. J., plant of American Can Co., New York, is using a mechanical device to make the test. Due to the unique side seam construction, the actual metal of the can body will stretch before the side seam gives out

eration in April, 1955. Initially, the casting machine will be equipped to make 40-lb customer ingot. However, with interchangeable molds, the machine is capable of casting smaller ingot on demand.

Porter Buys West Coast Firm

H. K. Porter Co. Inc., Pittsburgh, acquired Pioneer Rubber Mills Inc., Pittsburg, Calif., manufacturer of industrial rubber products, and will operate it as part of Quaker Rubber Corp., one of Porter's nine divisions. Pioneer Rubber Mills will retain its identity under the management of Sumner M. Suhr.

Brunswick Mining Expanding

Brunswick Mining & Smelting Corp. Ltd., Bathurst, N. B., plans to spend $3,250,000 on its properties in Gloucester county this year.

Evans Boosts Plating Capacity

Evans Products Co., Plymouth, Mich., increased its nickel plating capacity by more than 200 per cent through purchase of a fully automatic plating unit. The expansion was necessary because of the Evans company's recent acquisition of the Cycle Division of Colson Corp., Elyria, O.

Expansion in Aluminum

Doubling of facilities in Banbury, England, is sponsored by Aluminum Ltd., Montreal

ALUMINUM LTD., Montreal, Que., reports completion of new extensions to the research facilities of its subsidiary company, Aluminum Laboratories Ltd., Banbury, England, which more than doubles the size of that establishment. The expanded scientific program at the Banbury center makes available to the North American aluminum industry additional knowledge of new technical developments originating in Britain and Europe.

The English branch of Aluminum Laboratories Ltd. conducts basic and applied research in the light metals field and investigates technical problems in the fabricating and sales fields for the benefit of customers and associated companies of the Aluminum Ltd. organization.

Facilities—The new Banbury facilities include a laboratory for the testing of large prototype aluminum structures for ships, bridges and other purposes. Another section is devoted to research into the use of aluminum for canning, which in turn includes equipment for drawing and lacquering aluminum containers and testing their behavior when packed with different products.

A model plant for the production of aluminum paste used as a pigment for paint is also available, as are facilities for development work on welding and other joining processes suitable for the metal and its alloys.

Automotive Success Story: Power Steering

In 2½ years, 1 million power steering units have come off assembly lines at Saginaw Steering Gear Division, General Motors Corp., Saginaw, Mich. Units are standard on Cadillacs and Buick Roadmasters, optional on other GM cars

REPRESENTATIVES

Cosa Corp., New York, importer of Swiss and German machine tools, organized Cosa Corp. of Ohio as an associated company with offices at 3315 Brookpark Road, Parma, O. William Jenks is manager. Another associated company, Cosa Corp. of Detroit is operating from new headquarters at 20118 James Couzens Highway, Detroit, under the managership of Anton Joen.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif. appointed T. E. Conklin Brass & Copper Co., New York, as a distributor of its aluminum mill products. Conklin has doubled its warehouse area to a total of 100,000 sq ft with the acquisition of a building at 270 Nevins St., Brooklyn, N. Y. Other warehousing and servicing facilities are located at 113-115 Leonard St., New York.

Central Iron & Steel Co., Harrisburg, Pa., and Phoenix Iron & Steel Co., Phoenixville, Pa., both subsidiaries of Barium Steel Corp., New York, appointed Victor J. Leo of Montreal, Ont., as eastern Canadian representative.

Buhr Machine Tool Co., Ann Arbor, Mich., appointed as its agents: Ellfeldt Machinery & Supply Co., Kansas City, Mo.; Interstate Machinery & Supply Co., Omaha, Nebr.; Giebel Inc., New York; and Tool Engineering Service, Birmingham.

Dow Chemical Co., Midland, Mich., appointed Fullerton Steel & Wire Co., Chicago, as a distributor of its magnesium mill products. The Chicago firm distributes a complete line of steel, brass and aluminum mill products and has fa-

cilities for shearing, slitting, edging and sawing.

Bethlehem Pacific Coast Steel Corp., San Francisco, appointed Triangle Steel, Los Angeles, as a distributor of its wire rope.

Allis-Chalmers Mfg. Co., Milwaukee, appointed Mohawk Wholesale & Equipment Co., Yuma, Ariz., as a distributor of its motors, controls and transformers.

Shieldalloy Corp., New York, appointed Industrial Foundry Supply Co., San Francisco, as its agent in Northern California; Gordon Sondraker & Co., Maywood, Calif., in Southern California. Shieldalloy products include ores, minerals and ferro powders.

Thermo Electric Co. Inc., maker of pyrometric equipment, Saddle River township, New Jersey, appointed as new sales representatives: Delaware Valley Engineering Co., Philadelphia; G. L. Clapper, Pittsburgh; Abbott Co., Cincinnati; and H. H. Barnum Co., Detroit. D. F. Barringer, Cleveland, will handle northern Ohio and the Buffalo territories.

Cleaver-Brooks Co., Milwaukee, appointed Lefler Wyomont Supply Co., Billings, Mont., and C. R. Carey, Knoxville, Tenn., as representatives for its boiler equipment.

NEW ADDRESSES

Los Angeles district office of **Bailey Meter Co.**, Cleveland, manufacturer of industrial instruments and automatic control equipment, was moved to larger quarters at 816 S. Atlantic Blvd., Monterey Park, Calif. The firm's Cincinnati district office was moved to 2330 Victory Parkway, that city.

Research & Control Istruments Division, North American Philips Co. Inc., Mt. Vernon, N. Y., opened a regional office at 4959 W. Diversey Ave., Chicago, under managership of J. C. Washburn.

Kelman Electric & Mfg. Co. moved to larger quarters at 1667 N. Main St., Los Angeles, for increased production of high-voltage circuit breakers.

ASSOCIATIONS

Charles E. Brust, president, Eastern Malleable Iron Co., Naugatuck, Conn., was elected president of **Malleable Founders' Society**, Cleveland. Other officers are: Vice president, Carl L. Liebau, executive vice president and general manager, Federal Malleable Co., West Allis, Wis.; treasurer, D. V. Walker, managing director, Eberhard Mfg. Co., division of Eastern Malleable Iron Co., Cleveland; secretary, L. D. Ryan, managing director of the society.

Charles T. Milles, president, C. H. Milles Foundry Co., and Campbell V. Adams, works manager, Vulcan Iron Works, both of Chicago, were presented with testimonial plaques by **Chicago Foundrymen's Association.**

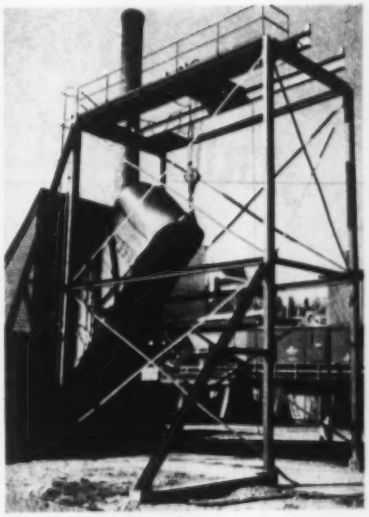
John A. Stringer, controller, Horace T. Potts Co., Philadelphia steel warehousing firm, was elected a national director of **System & Procedures Association of America**, Philadelphia.

Officers of the Southern California section of **American Society of Mechanical Engineers** for 1954-55 are: Chairman, L. F. Richardson, Bailey Meter Co.; vice chairman, R. M. Hatfield, Combustion Engineering-Superheater Inc.; secretary-treasurer, F. J. Fontana, Richfield Oil Corp.

Malleable Founders' Society, Cleveland, presented the 1954 award for outstanding service to the malleable iron castings industry to John A. Wagner, president, Wagner Malleable Iron Co., Decatur, Ill.

A. C. Monteith, vice president in charge of engineering and research, Westinghouse Electric Corp., Pittsburgh, was elected president of **American Institute of Electrical Engineers**, New York. Mr. Monteith will take office Aug. 1 and will serve until Aug. 1, 1955. Vice presidents are: G. J. Crowdes, Simplex Wire & Cable Co., Cambridge, Mass.; J. P. Newbauer, Consolidated Edison Co., New York; C. M. Summers, General Electric Co., Ft. Wayne, Ind.; S. M. Sharp, Southwestern Gas & Electric Co., Shreveport, La.; and J. R. Walker, U. S. Bureau of Reclamation, Billings, Mont.

Ralph R. West, president, West Steel Casting Co., Cleveland, was re-elected president of **Cleveland Engineering Society** for a second term. This is only the second time since 1889 that a president of the society has been re-elected.



Lifting Muscle

This 35-ton capacity hoist is able to dump material from truck trailers by one easy lift from Bethlehem Pacific Coast Steel Corp. wire rope. The hoist is 45 ft above ground, leaving adequate clearance for 38-ft-long trailers. In many applications, the apparatus has proved an improvement over the old method of using self-dump trucks

VACATIONS

Winchester Repeating Arms Co., New Haven, Conn., will close its plant for a vacation period from Aug. 21 to Sept. 6, inclusive. This division of Olin Industries Inc. will not accept any deliveries during that period and requests that material be shipped so that it arrives before Aug. 21 or after Sept. 6.

Chicago Pump Co., Chicago, will close its factory for vacation from July 3 until July 19. No material will be received during that period.

your best buy in magnets

Month in and month out, EC&M Type SW ALL-WELDED Lifting Magnets give evidence of speedy handling of pig and scrap iron. *Costs are lower because output is higher.*

Equally important is the fast release of the load at the point of discharge. EC&M Automatic-Discharge Magnet Controllers are adjustable to suit material handled and size of magnet; adjustment permits compensation for voltage variation. *This exclusive EC&M feature cuts down the time between magnet-trips.*

For topmost performance, specify EC&M Lifting Magnets. *The high return quickly repays the low initial cost.*

advantages of ALL-WELDED magnets

1. Sealed against entrance of moisture.
2. No pole-shoe tightening maintenance.
3. Better proportion of coil space.
4. High lifting capacity throughout magnet life.

write for bulletin 900

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

STEEL
July 5, 1954

Technical Outlook

HOPPER-FED BROACH—Lapointe Machine Tool Co., Hudson, Mass., is building a 60-inch-capacity continuous horizontal broaching machine for broaching automotive differential carrier bearing caps. It will broach the joint faces from rough castings and will process 1800 parts an hour. Parts are loaded in a chute suitable for hopper or hand feed. A safety switch prevents improper loading of the machine. Parts are drawn over the stationary broach at 45 fpm. Previous method of broaching turned out about 500 parts an hour.

ROBOT CONTROL—The new manipulator, used in conjunction with Argonne National Laboratory's three-dimensional television system, allows scientists to perform (for the first time) complex laboratory and process manipulations at a great distance or behind a sealed barrier with a speed and dexterity approaching the free hand. The device reproduces the seven basic motions employed in grasping, lifting, moving and turning objects. It has two master handles connected to two slave hands by electrical cables.

FLASH SINTERING— Use of flash sintering to produce turbo-jet engine blades and other heat-resistant components is being explored by the Air Force. Method involves the rapid heating of metal powder mixtures by direct passage of high amperage current, at the same time applying high pressure on the die.

CRACKS GO—Study by Battelle Memorial Institute concludes that most weld-metal cracking is interdendritic or intergranular and occurs generally at high temperatures. Problem is especially serious in high strength steels used in aircraft.

SILICON RECTIFIER—Promising device for conversion of alternating current to direct current is a new type silicon rectifier announced by Westinghouse Electric Corp. The experimental device, with no moving parts, is said to have an efficiency of about 98 per cent. While most available silicon rectifiers generally produce less than one watt of power, the new unit is capable of delivering more than 1200 watts.

TITANIUM ANALYSIS—A spectrograph set up for aluminum and steel is being used by Ladish Co., Cudahy, Wis., to analyze titanium base alloys. Here's how: Titanium sample is dissolved and solution is placed in a small porcelain boat. Then a one-half-inch disc of graphite is rotated (5 revolutions per minute) in the solution so that the graphite disc is wet by the solution. This rotating disc is sparked to give Quantameter analysis.

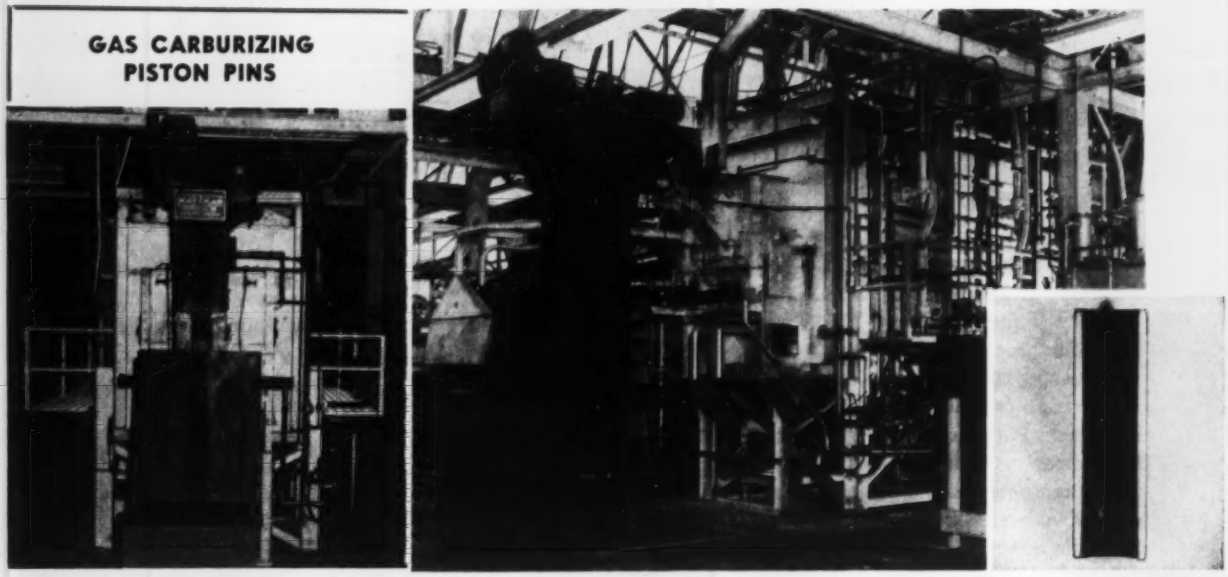
HOLD-UP— Widespread shift to plastic automobile bodies may be delayed by another member of the plastic family. Some of the men studying the plastics-vs-steel body issue point out that the tooling-cost advantages of plastic bodies has diminished with the advent of plastic tooling for steel bodies.

PUMPS FOR AEC— The Atomic Energy Commission and the Department of the Navy will invite bids for canned electric-motor-driven pumps with special leak-proof features. As part of its pump program (see STEEL, June 28, p. 108) the commission intends to buy four pumps with a capacity of 150 gallons of hot water a minute under pressure of 2200 psi and two with a 30-gpm capacity. The Navy expects to purchase four of the 150-gpm size.

430 COMPARED WITH 302— A 12-month comparative use test of type 430 and type 302 stainless steel hospital utensils was made in a Chicago hospital. Inspection of parts was made by four experts. One reported that 302 was superior to 430 in corrosion resistance. Three indicated that no difference of importance was noted in corrosion resistance.

Metalworking Outlook—p. 21 *Market Outlook—p. 97*

GAS CARBURIZING PISTON PINS



At Chrysler Corp., pins are loaded into a compartmentalized vertical conveyor and carried up to where they are dumped onto another conveyor which carries them through the furnace

Case Hardening Steel

Carburizing today is more than just a way of putting carbon into the surface of steel. You can get physical properties uniquely suited to the engineering application of the part

CARBURIZING makes it possible for you to put a high carbon steel surface on low carbon steels. The composite is then heat treated to harden the case and leave the needed properties in the core.

Traditionally, the process has sought this combination: A hard, strong case and a tough, shock-resistant core. Modern thinking is that the piece as a whole, rather than the core by itself, must have toughness.

Trend is to specify harder and stronger cores for greater resistance to notch propagation and better support to the case under heavy loads.

Reasons — Why is a hard surface layer on steel parts desirable? 1. It resists penetration by concentrated loads. 2. The endurance limit goes up because the increased strength of the surface layer tends to prevent scratching and formation of stress raising notches. 3. The hard surface is in a state of compression, which adds up to more protection against fatigue. 4. Protection against wear is the most sought-after property of the hard surface.

For wear resistance only, the properties of the surface are significant; usually a shallow case is enough.

Applications seeking resistance to indentation or fatigue are not as simple. Fatigue may be initiated below the surface. This calls for special attention to case depth and hardness gradients.

Hardness—Fully hardened carburized steels have a martensitic surface layer, hardness of which is dependent on carbon content. Tempering beyond stress relief stage reduces the hardness. Retained austenite has the same effect.

Hardness at the surface is a simple way of judging carburized cases. (Values in range of 55 to 65 Rc are reached.) In some respects, it's open to objection because indentation hardness at the surface is a function of case thickness and carbon gradient, as well as inherent hardness.

Methods—Rockwell C hardness can be measured directly only on cases thicker than 0.025 inch. For thin cases, loads should be lighter and measurements made on Rockwell A, Rockwell Superficial or Vickers Brinell scales.

By microhardness testing, inherent hardness values for a case can be obtained at different levels by making measurements on a cross section; effects of underlying structures are thus eliminated. From relations between hardness and strength properties, approximate values of tensile and yield strengths of the cases may be found.

Core properties vary with carbon and alloy contents of the steel and with heat treatment. Tensile strengths range from 100,000 to 200,000 psi, yield strengths from 40,000 to 180,000 psi.

Depth — This is an important variable in carburizing. Case thickness is measured visually, by hardness traverses or composition. Visual means depend upon structure difference between case and core. Hardness traverses are made on

Surface, Outer Diameter	Hardness Rockwell C 62/63
0.010	63
0.020	59
0.030	55
0.040	49
0.050	41
0.060	37
0.075	39
0.085	45
0.095	52
0.105	59
0.115	63
Surface, Inside Diameter	64

←Inset — Longitudinal cross section of gas carburized piston pin. Above—Hardness at various depths

OLD METHOD—PACK CARBURIZING AISI 1117—coarse grain stock

STEPS

1. Cut-off
2. Chamfer
3. Grind
4. Pack Carburize at 1680°F. 0.030 to 0.040 inch after grinding
5. Box cool
6. Drill Hole
7. Heat in cyanide at 1600°F 20 minutes
8. Quench in oil
9. Reheat in cyanide at 1400°F 20 minutes
10. Quench in solution
11. Temper at 400°F for 30 minutes. 58 Rc minimum
12. Finish grind
13. Lap

NEW METHOD—GAS CARBURIZING AISI 1117—fine grain stock

STEPS

1. Cut off
2. Chamfer
3. Grind
4. Drill hole
5. Gas carburize at 1680°F 0.030 to 0.040 case depth (outside diamter after grinding)
6. Quench in solution
7. Temper at 400°F for 30 minutes. 58 Rc minimum
8. Finish grind
9. Lap

By Carburizing

No. 5 in STEEL's MODERN HEAT TREATING SERIES

taper-ground or step-ground surfaces and on cross sections. Several ways of indentation hardness testing, including microhardness methods, can be used. Chemical analysis is the least convenient method.

Improvement in fatigue properties is an important reason for carburizing in many applications. Case depth for good endurance is dictated by the shape of the part and type of loading. Case must be thick enough to withstand any expected load concentrations beneath the surface.

Benefit Here—Present-day trend toward stronger cores makes it possible to use thinner cases. Also, as distortion problems are reduced and less material needs to be sacrificed in finishing operations, thinner cases become possible.

Residual stresses in carburized parts are important to performance, especially under fatigue conditions. Experts say that more good than bad can be attributed to effect of residual stresses.

Pick the Steel — Three factors come into the picture when deciding on a carburizing steel: Carbon content, grain growth characteristics and alloying elements.

Most common carbon analyses are 0.020 per cent for plain carbon steels and from 0.08 to 0.20 for alloy steels. Higher carbon content (particularly in plain carbon types up to a maximum of 0.40 per cent) are now used for increased core strength and better support of the case. This is due to present-day trend of stronger cores and thinner cases.

For straight wear resistance, emphasis on core properties ease off and other considerations take over. When fatigue loads are involved, core properties, case depth and structure of the transition zone between the case and core gain importance.

Good Point—Fine-grained steels are best because they allow simpler heat treatment schedules, especially in direct quenching from carburizing temperature. This gives lower costs and also reduces distortion, which may become aggravated when parts must be reheated for hardening.

A McQuaid-Ehn (ASTM) grain size number of 5 or finer is commonly specified. This test is carried out by pack carburizing a specimen four hours at 1700°F, followed by slow cooling to develop a cementite network which outlines the austenite grains.

Carbon vs Alloy—Plain carbon steels are used in many applications where distortion is not a primary problem and the core properties required are not high. Alloy elements increase hardenability and improve fatigue properties of the core.

Some users say the higher price of alloy steels is offset by better machinability and lower finishing costs due to reduced distortion. Grinding operations cost money; if too much stock is removed, the case may be soft in some areas. Tendency to form grinding checks also increases with amount of stock removed.

Plain carbon steels for carburizing generally have carbon under 0.25 per cent. Higher carbon may reduce core toughness after hardening. Tensile strength after quenching should not exceed 100,000 psi.

Alloy — Low alloy steels, in range of 2 per cent of alloying elements such as nickel, chromium, manganese, vanadium, molybdenum, can be hardened by oil quenching. This minimizes dangers

COMPOSITION OF SOME COMMON CARBURIZING STEELS

AISI No.	Carbon	Manganese	Nickel	Chromium	Molybdenum	Vanadium
1020	0.20	0.45	...	...	...	...
1320	0.20	1.75	...	...	...	...
3115	0.15	0.50	1.25	0.65	...	...
3310	0.10	0.50	3.50	1.60	...	...
4320	0.20	0.55	1.80	0.50	0.25	...
4615	0.15	0.55	1.80	...	0.25	...
4815	0.15	0.50	3.50	...	0.25	...
5120	0.20	0.80	...	0.80	...	...
6120	0.20	0.80	...	0.80	...	0.15
8620	0.20	0.80	0.55	0.50	0.20	...
9310	0.10	0.55	3.25	1.20	0.12	...

CASE CLASSIFICATION

TYPE	DEPTH	APPLICATION
Light	less than 0.020 inch	Wear resistance at low loads.
Medium	0.020 to 0.040 inch	Wear resistance with sufficient strength to withstand moderate service loads.
Heavy	0.040 to 0.060 inch	For severe abrasive, sliding or rolling wear combined with heavy crushing loads or alternate bending stresses.
Extra heavy	more than 0.060 inch	Resist wear, shock and high unit loads with rapid sliding action.

Note: Unnecessarily thick cases should be avoided. They are more expensive to produce and have a greater tendency to distort and spall.

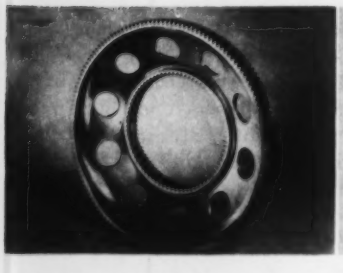
of distortion and cracking. They have less tendency to develop coarse-grained structures at carburizing temperature and, in most instances, can be hardened by a direct quench. Chromium is a valuable alloying element because it reduces tendency to retain relatively soft austenite after heat treating.

Nickel-molybdenum steels have good machinability. They give a tough case and a strong, tough core. Some users feel that nickel steels have lower surface carbon concentrations for a given carbon potential in carburizing. Also, they may retain some austenite after heat treatment.

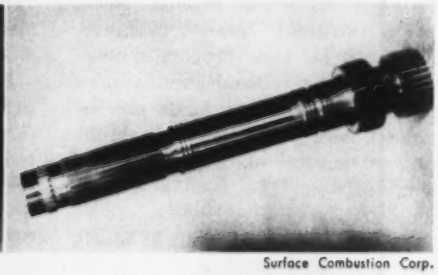
No Rule—Feelings are mixed on effects of this retained austenite. Since it lowers the case hardness, it's possible that it may decrease wear resistance under some conditions. The low martensite transformation range of the case, compared to the core, results in high compressive stresses in the case, which is favorable for applications requiring high resistance to fatigue. The toughness of the austenite also results in better performance under impact wear conditions.

Chromium increases hardenability and helps in retention of hardness at moderate temperatures. It is conducive to high carbon concentrations at the surface, giving better wear resistance but less toughness and a greater tendency to spall.

CARBURIZED AIRCRAFT PARTS



Steel: AMS 6260
Case depth: 0.025–0.40 inch (finish grind)
Hardness: 81–85 Rockwell A
Surface carbon: 0.90–1.00%
Core hardness: 30–40 Rc



Surface Combustion Corp.

Steel: AMS 6260
Case depth: 0.015–0.030 inch (finish grind)
Hardness: 81–85 Rockwell A
Surface carbon—0.90–1.00%
Core hardness: 30–40 Rc

Carbon content of the higher alloy carburizing steels is generally limited to about 0.20 per cent because of their greater hardening capacity. A low quenching rate is the usual rule, and high core toughness and strength can be developed.

Heat Treating—Methods of heat treating peculiar to carburizing are controlled by the need of treating a high carbon case and a low carbon core at the same time, in the same piece. These two zones have different transformation temperatures and different hardenabilities.

Another point: They cannot be cooled at the same rate, especially in the larger sections. The high carbon case may open up a few problems in its own right: Precipitation of a network of carbides and the tendency to retain austenite.

Grain Growth — Carburizing temperature is above the upper transformation range. Steels having a grain coarsening temperature below the carburizing temperature undergo grain growth, which has undesirable effects on mechanical properties. A so-called double heat treatment is sometimes used to correct this condition; however, it is best avoided by use of steels having a high grain growth temperature.

If the carbon content of the case is more than the eutectoid composition, slow cooling from the carburizing temperature leads to the formation of a network of proeutectoid cementite, which may cause cracking during grinding or a brittle failure. The cementite network can be eliminated only by reheating above Acm and cooling sufficiently fast to prevent it from reforming. Excess carbide, if present in spherical form, is considered desirable in some wear applications.

Holds on—Austenite may be retained in quenched carburized cases owing to the carbon and alloying elements present. Amount of retained austenite may be reduced by treatment at subatmospheric temperatures, usually before tempering (see No. 4 in STEEL's Modern Heat Treating Series on low temperature treatment, June 28, p. 104). Retained

THREE CARBURIZING METHODS

Although they differ in operation and chemistry, pack carburizing, gas carburizing and liquid carburizing serve the same function: They make carbon available at the surface of the steel to be case hardened. Rate of case formation depends on the rate of diffusion of carbon into steel. This is set by the temperature and the carbon gradient, which is determined by the carbon content maintained at the surface.

To increase case depth from 0.025 to 0.050 inch (double), time of carburizing at 1700° F must be increased from about 1 hour to over 4 hours. While raising the temperature increases the rate of case formation, use of this expedient is limited. One factor is more expensive furnace maintenance; others are more distortion and grain growth as more degrees are added.

Also there is the possibility of increasing the surface carbon concentration, which is undesirable. This means carburizing temperatures over 1750° F are rarely used; usual temperature is 1700° F for pack and gas carburizing and somewhat lower for liquid carburizing.

Time required for a charge to reach operating temperature depends on rate of heat transfer and amount of heat stored in the furnace system. Pack carburizing is the slowest and liquid carburizing the fastest. Difference in heat-up time takes on more significance as the case thickness is decreased.

PACK CARBURIZING—Chemistry involves transfer of carbon from compounds of charcoal, coke or their mixtures, to which smaller amounts of carbonates or organic materials are added. Parts to be case hardened are packed with carburizing compounds in boxes or pots, which are closed and heated.

Although losing ground because of high labor cost and lack of control, chief advantage of the pack method stems from its simplicity. No special furnace design is required; but good temperature control is desirable. Since the compound supports the work load, no fixtures or separators are necessary. Work can be protected from oxidation during cooling.

Case depth varies with position of parts in the container due to lack of uniformity in heating. A tolerance of ±0.010 inch is usually required. Process is most suitable for medium or heavy cases. It is especially useful in handling big, awkward parts.

GAS CARBURIZING—Chemistry is based on decomposition of hydrocarbons at elevated temperatures. The furnace atmosphere must maintain a carbon potential with respect to the steel. This is done with hydrocarbon gases—methane (natural gas), propane, butane, vaporized hydrocarbon fluids or manufactured gas in some instances.

Adaptability of the process to high volume output is realized to fullest extent in large continuous furnace installations. Many batch furnaces are also used. In both types of furnaces, supply of carbon-bearing gases must be replenished continuously. Good circulation within the furnace chamber is needed.

Take out the guess work: That's where the emphasis is going in gas carburizing these days. Since dew point and carbon potential of the furnace are directly related, automatic controllers can be used for continuous measurement and automatic adjustment of the carburizing potential.

LIQUID CARBURIZING—Here, chemistry involves cyaniding under conditions that promote absorption of carbon by the steel and repress the absorption of nitrogen. Cases approach those from pack or gas methods.

Distortion tends to be less in liquid carburizing than in other processes. Good heat transfer gives rapid heating of the charge. Flexibility is the advantage that keeps the process in some plants. Selective case hardening is possible on parts by partial immersion. Different charges may be treated in the same bath at varying cycles. Carburizing may be combined with brazing in a single operation.

austenite increases tendency to form grinding checks during finishing work.

Distortion comes from inadequate support of the work in the furnace, uneven heating, too high carburizing temperature and too fast cooling. For minimum distortion, water quenching is satisfactory only with simple shapes or massive sections. Oil quenching is the general rule with alloy steels. Fast cooling may be required to bring out optimum core properties.

Hardened carburized steels are tempered for stress relief, usually at 300 to 400°F. Such tempering does not necessarily reduce the hardness or wear resistance of the core, but helps resist cracking during grinding or in service.

Hardening by direct quenching from the carburizing temperature can be used only with fined grained steel. This treatment holds back the precipitation of a network of excess carbides and results in maximum hardness in the core. Direct quenching into a martempering bath minimizes distortion.

Slow cooling from the carburizing temperature to a temperature above A_1 followed by quenching reduces the tendency to retain austenite. This treatment may also be combined with martempering.

Re-Heat—Some treatments may require a single reheating after slow cooling or quenching from the carburizing furnace. As the temperature for this reheating is raised, some grain coarsening may take place in the case but the core properties are improved. Retention of austenite and the solution of excess carbides are favored by increasing the temperature of reheating. Fine grained steels are needed here too.

A double-quench treatment after slow cooling is on the way out because, with present costs, it is cheaper to use alloy steels with less complicated heat treatments. This procedure is intended to refine the structure of both the core and the case and to spheroidize excess carbides.

Parts of this article are based on a chapter prepared by M. B. Bever and C. F. Floe, Massachusetts Institute of Technology, for *Surface Protection Against Wear and Corrosion*, soon to be published by American Society for Metals, Cleveland, Ohio

This is a line check valve used for liquids or gases. The disc was fabricated from 17-7 PH stainless steel

PRECIPITATION HARDENING PART 2

By DR. A. L. FEILD
Associate Director
Research Laboratories
Armco Steel Corp.
Baltimore, Md.

How To Work Stainless The Easy Way

Grade 17-4 PH combines high strength and corrosion resistance. Hardening is done by a single, low-temperature heat treatment that eliminates scaling and distortion problems

IF YOU HAVE fabrication problems, it may pay to take a look at the new precipitation hardening stainless steels.

In the hardened condition, Armco's 17-7 PH flat rolled products, for example, have a higher yield and tensile strength than full hard sheet or strip of the 301 type. Compressive yield strength, longitudinal and transverse, is somewhat higher than tensile yield strength. Material can be fabricated in the relatively soft or annealed condition and hardened later.

High-tensile 301 strip has relatively low ductility and is apt to be lacking in flatness. It must be fabricated in its hardened condition, with the annoying springback problem that becomes increasingly troublesome as the full-hard condition is approached. Forming operations are severely limited.

Phase transformation in annealed (Condition A) material (brought about by heating at 1400° F and cooling to 60° F, Condition T) is accompanied by a dimensional increase of about 0.004 inch per inch. Allowance should be made for this in laying out parts. Holes should be made after the 1400°-F treatment, if the dimensional change is significant. The final hardening treatment (950 to 1050° F) results in a contraction of about 0.0005 inch per inch.

Condition C — When properly heat treated, cold-worked, 17-7 PH wire, sheet and strip have exceptionally high elastic and strength values—of the same order as those of fully-hardened, carbon spring steel. Because of their high elastic properties, the flat-rolled products are not suited to difficult forming. Cold rolled or cold drawn mill products of this class are in Condition C.

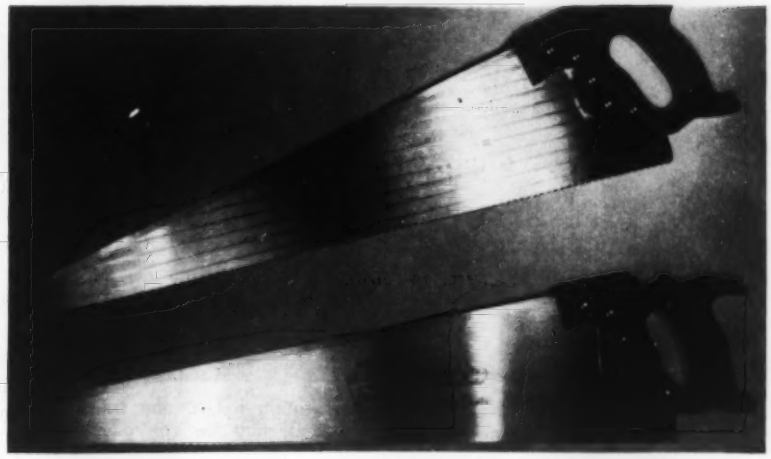
Properties are developed by a single heat treatment of the precipitation-hardening type—900° F for one hour, followed by air cooling. The hardened material (Condition CH 900) has a higher tensile, compressive yield and tensile strength than type 301 stainless spring material.

At room temperature, mechanical properties are similar to those of hardened, high-carbon and alloy spring steels. In addition, 17-7 PH in Condition CH 900 retains its elastic properties to a remarkable degree up to service temperature of 600° F. Above this temperature, design should be based on creep and stress-rupture data.

With thin-gage strip and 0.07-inch diameter wire and smaller, tensile strengths above 300,000 psi are readily obtained. Latter surpasses the properties of the best music wire in diameters 0.100 inch or greater and is comparable for smaller diameter wire. Carpenters' hand saws made from strip have outperformed carbon steel saws and are corrosion resistant.

Armco 17-4 PH—This precipitation-hardening grade has a combination of high-strength and corrosion-resistant properties. Hardening is done by a single, low-temperature heat treatment that eliminates all problems of distortion and scaling. Grade is offered as bars, wire, forging blooms or billets.

As shipped from the mill, bar and wire are in the annealed or solution-treated condition—Condition A, which is brought about by heating at 1875 to 1925° F. Air cooling from the annealing temperature is recommended, except where small sections do not ex-



Saws were fabricated from 0.042-inch-thick, hard-temper 17-7 PH. Use of stainless bypasses corrosion problem

ceed about 3 inches in cross section. The latter may be oil quenched. Final cooling to 90°F or lower is needed to obtain complete transformation.

Maximum hardening is accomplished by a single heating at 875° F (for one to four hours) followed by air cooling, Condition H 875. On similar heat treating at higher temperatures, such as 1000° F, the steel becomes softer with some drop in yield and tensile strength (Condition H 1000). This treatment is for greater ductility and notch impact strength than Condition H 875. By varying the hardening temperature between 875 and 1200° F, a wide range of properties can be obtained.

Forgings—Forgings of intricate shape can be readily produced from 17-4 PH blooms, billets or bars. Blank should be heated uniformly (2150 to 2200° F) and held at temperature at least 15 minutes before forging.

For sections over 3 inches in diameter or thickness, the material should be heated to 2150 to 2200° F and held for one hour for each inch of thickness before forging. Then the forging should be annealed to place the material in best condition for the following hardening operations.

Machining—Grade 17-4 PH can be machined in all conditions to dimensions without allowance for scaling or distortion. Machining rates for Condition A should be the same as for type 410 stainless with a Brinell hardness of 280 to 320. In the fully hardened condition (Condition H 875), the grade should be machined at 60 per cent of the rate for Condition A.

Final finishes are excellent. Cold sawing is recommended for cutting bars and forging billets. Hot cutting or abrasive wheel cutting should not be used. The material may crack.

The low temperature, precipitation-hardening reaction leads to a contraction amounting to about 0.0004 inch per inch. Allowance should be made for this in larger sections.

Analysis—Chemical composition of 17-4 PH is adjusted with respect to austenite and ferrite-forming components. While austenitic at the annealing or solution-treatment temperatures of 1875 to 1925° F, the alloy transforms on cooling to a martensite-like structure, with a small precentage of ferrite and retained austenite. This transformation begins at about 250° F.

By incorporating about 0.25 to 0.45 per cent columbium, hardness in Condition A is decreased somewhat and may improve ductility. The same final hardness and mechanical properties can be obtained after the hardening treatment with or without columbium.

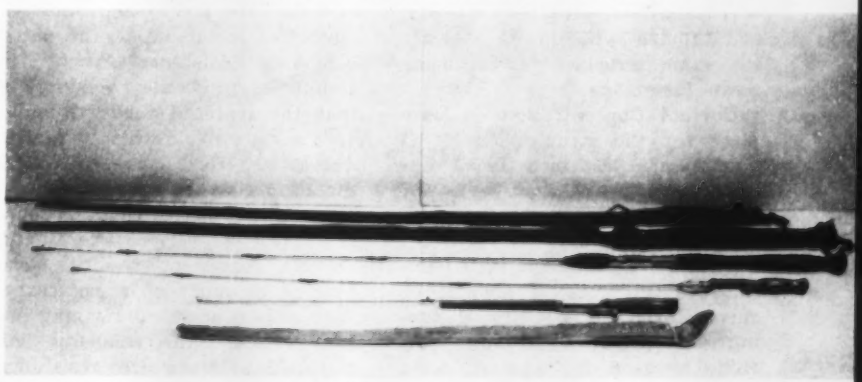
Welding—In welding 17-7 PH in Condition A by the ordinary metal-arc process, coated electrodes of 17-4 PH should be used. Filler rods or electrode wire of 17-7 PH analysis are quite satisfactory for inert-gas-shielded arc welding. When an assembly is given the 1400°-F, plus 950°-F treatment, after welding, its strength is about equal to that of the hardened parent metal.

All resistance welding processes regularly used on stainless steels can be satisfactorily performed on 17-7 PH. They should be performed after the 1400°-F treatment or after the double heat treatment—preferably the former. In Conditions C and CH (hard-temper, cold-worked material) it is not always practical to weld.

The 17-4 PH grade is readily welded by the usual methods used for stainless steel. Weldments may be precipitation hardened to high strength values.

This is the last of two articles on the subject by Dr. Feild. First, published last week in STEEL, discussed 17-7 PH stainless steel.

Fishing rods are made by taper grinding 0.215-inch diameter, 17-7 PH wire to proper taper for easy casting



Computor control plate and post assemblies are cleaned before welding to achieve necessary close surface control

Resistance welder uses locating fixture and special electrodes. Size of projections must be controlled exactly

PROJECTION WELDING

Fewer Steps in Aluminum Assembly

Process is said to save time compared with drilling and tapping, yet affords at least the same structural strength as screw fastenings

Induction soldering of computor control is seen above. Thermocouples are used to show temperature distribution

ALUMINUM projection welding has proved successful in joining thirteen integral parts to both sides of an aluminum sheet, forming an inner instrument frame made by Ford Instrument Co., Long Island City, N. Y.

As the assembly must be hermetically sealed, fastening parts to the sheet by screws would mean 26 additional holes to cope with in sealing. The process is said to save time compared with drilling and tapping, yet affords at least the same structural strength as screw fastenings.

Current Concentration — Base plate for the structure is 52SO aluminum, 0.0625 inch thick. Fusion takes place at a depth of about 0.040-0.050 inch. Secret of the operation, says E. Nyitray, Ford process engineer, is to concentrate the greatest amount of current over the least area in fusing the parts. A tri-phase machine is used for squeeze, weld and forge sequences. Most welds are in two to three cycles, over 36 to 48 milliseconds.

Pressure during weld time is 350 psi, increased to 750-800 psi for forge time. In welding, 40,000 to 45,000 amp of current is applied. When current recedes during weld time, forge time takes effect. Assembly on pull test has shown strength of up to 750 pounds and will pull out base metal when separated, often taking a nugget of metal out of the plate.

Surface Resistance—Problem in aluminum projection welding is that the material tends to build up a surface oxide which is resistant to electrical current. When surface resistance varies from one piece to another, control of current must be varied accordingly. To get consistent results, close control of surface is necessary. With only a chemical cleaning before welding, the company has managed to lower the resistance of aluminum to 3 microhms.

Resistance welder uses a locating fixture and special electrodes. Size of projections must be controlled to within a few thousandths of an inch to achieve uniformity. Shape is also critical: If projection has a flat bottom there is too much resistance to break through; a tent shape or pyramid shape gives best results. All welds are analyzed and recorded permanently for quality control.

Induction Soldering—In induction soldering, a copper cooling jacket wraps around the case; heating coils are above it where weld area begins and are held by a Bakelite plate. Gearing arrangement on the cooling jacket hinges so both portions will open simultaneously.

Thermocouples and a timer control temperature range. Ford believes 500° F is the ideal top temperature to keep the nickel-plated aluminum in good condition.

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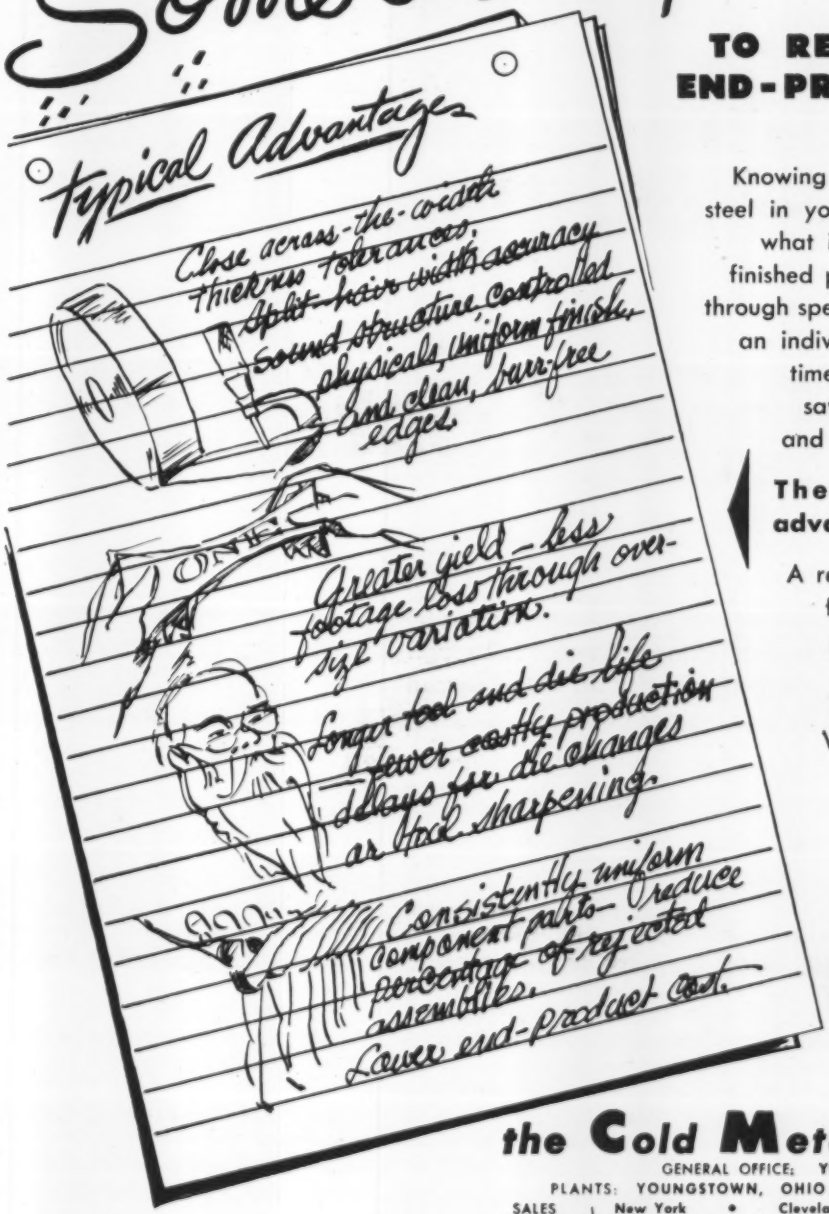
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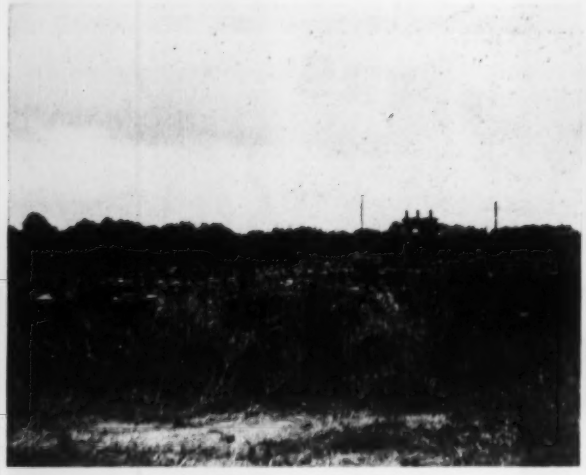


Before—Electrical equipment stored in this yard was nearly hidden by a thick growth of weeds and grass

After—The same yard is practically free of vegetation after treatment with a soil-sterilant chemical

Cut Weed Costs WITH CHEMICALS

A cupful of soil sterilant in two gallons of water is enough to control weeds in area of 200 sq ft for an entire season or longer. Usual dose is 40 pounds per acre

WEEDS were taking over in the hard-to-mow spots in the railway yard, along fence rows and around benzol storage tanks at a Texas steel plant.

Maintenance management was concerned because the men who checked railway cars had to struggle through the undergrowth to do their jobs; weeds thriving in a pile of ore next to the tracks blocked the view of switchmen; weeds were rusting out fences; and they increased the fire hazard around the benzol tanks.

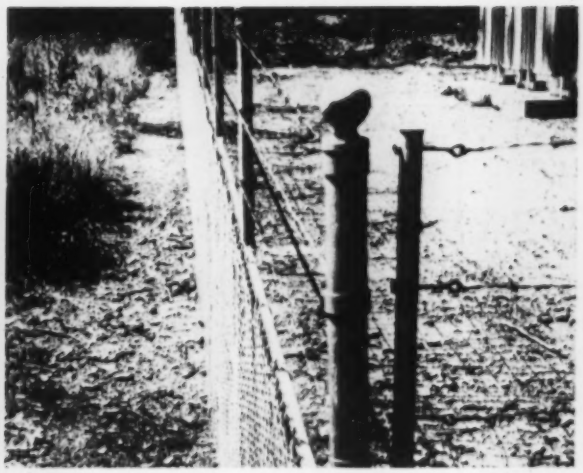
It was also likely that the weeds were holding moisture in the soil and rotting out railway ties; and if the plant had a security program, brush along fences could have hampered its efficiency.

Problem—Aside from the obvious impossibility of getting rid of all weeds by conventional methods, many companies have found that high labor costs practically prohibit the use of large ground crews to mow and clip grass around plants. And many of them, including the one in Texas, are turning to chemical weed and brush control.

Their experience has been that chemical treatment can make for a saving in money and labor and that the product of their efforts—a lack of weeds—is fairly permanent. Some use their own crews; others find it pays to hire custom applicators.

Agents—Chemical weed and brush killers are "specialists." Some, like 2,4-D and related compounds, are selective in their action. They kill some species of vegetation and leave others untouched. Some weed and brush killers attack woody plants, while grass and low-growing plants come back rapidly to prevent erosion. Soil sterilants are used where it is desirable to keep the ground free of all vegetation for an extended period of time.

Weed killer was applied from the wall of the metal building to the outer edge of the railroad tracks



Weed control can save substantially on maintenance costs in situations like this around a wire fence

A new soil sterilant is Du Pont's Telvar W weed killer. A cupful of the powder in two gallons of water is enough to control weeds on 200 square feet for an entire season or longer—the equivalent of 40 pounds to the acre.

The material is nonflammable, noncorrosive and is low in toxicity to humans or animals, under conditions recommended for use.

Texas Plant—The plant in the example first tried Telvar W on several test areas about 100 feet square. It worked so well they checked with the blast furnace to be sure it wouldn't hurt the ore. After checking out there, they embarked on a weed control program.

The sprayer is transported on a truck or hand car, whichever is the most practical for the area to be covered. The plant fence alone encloses an area of nearly a square mile.

Properties—The material is a wettable powder containing 80 per cent 3-(p-chlorophenyl)-1, 1 dimethyl-urea. You mix it with water and can apply it with a sprinkling can, hand or power sprayers. Only requirement is that the mixture should be agitated continuously and not allowed to settle.

It can be applied any time of the year when there is enough rainfall after application to carry the chemical down to the roots. Best results are obtained when it is applied before growth starts or just after vegetation is mowed. If applied on dense growth, enough water must be used to carry the material into the ground. Be sure to cover the area thoroughly.

In general, 40 pounds per acre provides good control for a season or longer. Dosages as low as 20 pounds per acre are adequate in many areas for shallow-rooted plants. Under adverse conditions of high rainfall, sandy soils and deep-rooted plants, dosages up to 80 pounds per acre may be required.

As with all weed killers, certain precautions are necessary to prevent damage to valuable plants. Do not apply on or near valuable trees or other plants or on areas into which their roots may extend. Do not apply to locations from which the herbicide may be washed or moved to the roots of valuable trees and plants. Apply with extreme care to prevent drift of the spray or dry powder into valuable plants or cropland.

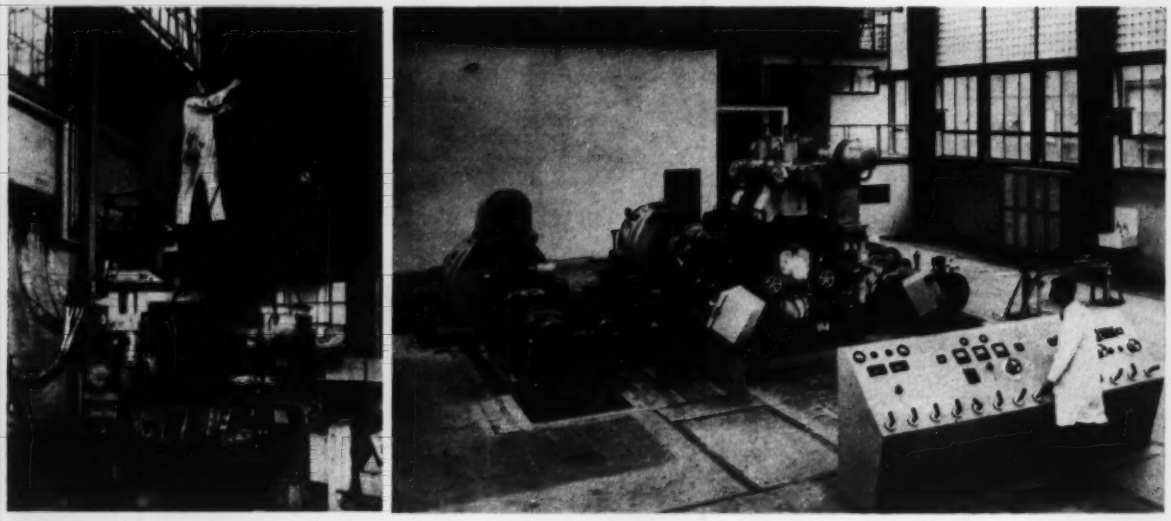
How To—One steel company uses a two-man crew and a tractor with a 50-gallon, power-spray unit attachment. They apply chemical early in the spring and results are evident in about two or three weeks.

Often, the whole job is hardly big enough to justify training personnel and investing in spray equipment. Possibly only a few days work is required each year. This is where custom applicator's can fit into the picture.

Picatinny Arsenal, Dover, N. J., sprays a 15-foot swath along the security fence on the perimeter of the arsenal area. Keeping weeds and brush under control has required a large crew during the warm months of the year. Now Picatinny has mapped out a chemical weed control program, which they expect will accomplish the same results with two men and a power sprayer.

Noncorrosive — A particularly important feature of the material is that it is noncorrosive. Alcoa has one of the longest aluminum fences in the world at its Bettendorf, Iowa, rolling mill. Before trying soil sterilant, they had to hand clip around each fence post (every 8 feet). After their laboratory found the chemical would not harm the fence, a swath of about one foot wide was sprayed on each side of it. Control lasted all summer.

Summary—Many companies are taking a look at chemical weed and brush control, including the Whitin Machine Works, Whitinsville, Mass.; Brown-Lipe-Chapin Division of General Motors, Elyria, O.; Bushnell Steel Works Inc., Tampa, Fla.; and Poe Hardware and Supply Co., Greenville, S. C.



The half-ton electric arc furnace at the Sheffield lab has 5-foot shell diameter and walls that can be varied from 17 to 26 inches in height. Furnace bottom is of austenitic steel so that induction stirring can be employed. On this mill, research on several systems of automatic gage control has been carried out

British Steel Industry Unifies Research

Modern labs of British Iron and Steel Research Association draw dispersed projects together. Arc furnace studies and automatic gage control work bear watching

NEW LABORATORIES of the British Iron and Steel Research Association at Sheffield, in Northern England, form the center for the association's work on the making, working, and metallurgy of steel. They draw together projects which are the outcome of nearly 40 years co-operative, but hitherto dispersed, research in the industry.

Like the association's three other research centers, the Sheffield laboratories are planned to pursue research to the stage of application. Facilities include two plant laboratories, equipped with pilot machinery for melting, rolling, drawing and forging, to bridge the gap between the laboratory, bench and full-scale factory operations.

Three Divisions — Research at Sheffield is organized within three divisions: Steelmaking, metalworking, and metallurgy. Each has at its disposal special equipment for its own research program, but joint use is made of general research facilities and of a central administrative and engineering section.

Significant among the investigations being carried out at Sheffield is work on problems bearing on possible extensions of electric steelmaking. Its aim is to reduce operating costs and so widen the range of steels over which the arc furnace can compete with the open hearth.

Pilot Arc Furnace—This work is being done on a 1120-pound arc furnace, in many ways of conventional Heroult design, but with special features to suit it to research. Shell is five feet in diameter and the height of the walls can be varied from 17 to 26 inches (sill to roof ring.) The furnace bottom is of austenitic steel so that induction stirring equipment can be fitted.

There is a specially high maximum forward tilt of 60 degrees with 15 degrees reverse tilt. The furnace transformer (500 kva nominal capacity) is larger than would be normal, to enable the effects of high-power input rates to be investigated. It is, in fact, the highest power input in relation to the size of the furnace in existence.

Electrode Wear—A quantitative examination of optimum power in-

Space and location are rarely a problem

One of the biggest factors in determining the location of an air compressor is its foundation requirements. Obviously, the more a compressor vibrates, the heavier the foundation must be.

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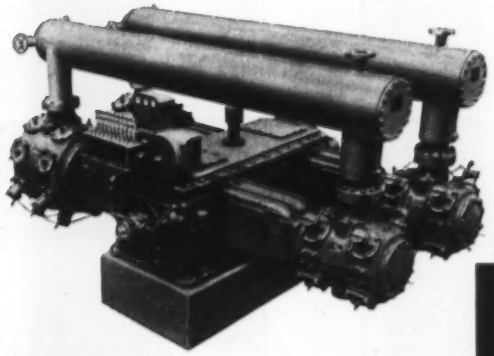

If you'd like to install a Clark unit on an upper floor that's structurally strong enough to support its weight, *do it* . . . and you won't need much space, either. Its compact design permits installing a large amount of horsepower in a limited floor area . . . and its precision construction means you can practically forget about it once it's in operation.

For complete details on this truly modern air compressor in the 150 to 4500 hp range, write for Bulletin 118 or get the facts first hand from your nearest Clark representative.

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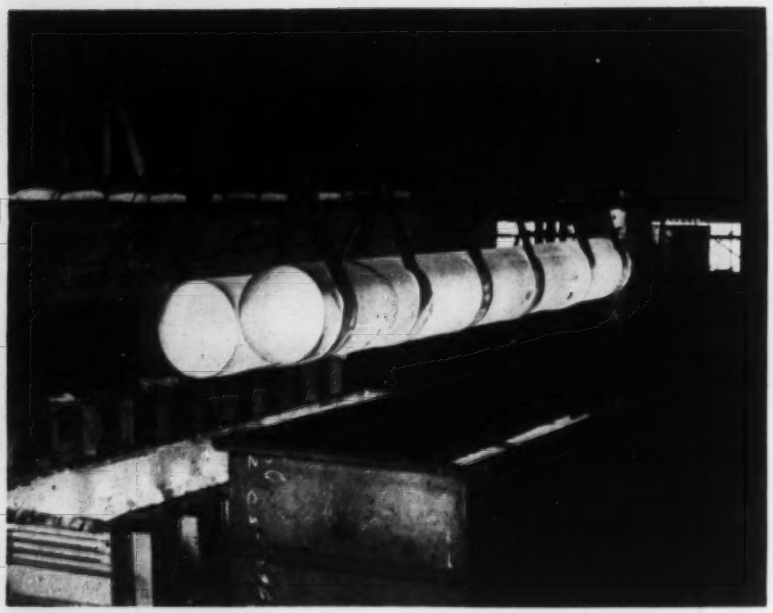


Distortion Averted By Special Handling

Special handling techniques prescribed by engineers at U.S. Steel's Consolidated Western Steel Division averted excess distortion of these long lengths of large diameter stainless steel pipe at the high temperature required in post fabrication heat treatment. The pipes are to be used for severe corrosion application in an Atomic Energy Commission project by Kaiser Engineers Division

put is being made in the Sheffield furnace, which has been found to require about 20 per cent less power with an input rate of 500 kva than with 250 kva. It is hoped to provide data from which it will be possible for plant design to balance the economic gains from more rapid melting down against the increased capital cost of bigger transformers and associated gear.

Controlled studies of electrode wear are also being made and trials of Soderburg electrodes and other alternatives to graphite will be made.

Check The Variables—A whole series of trials is designed to explore the effects of changes in a number of practical variables such as rate of power input, roof height, type of scrap and charge size. Refractory wear and over-all furnace heat balance are also under investigation. It will be quite a long time before enough results are available for reliable statistical examination; but the association believes the results already obtained are capable of useful interpretation.

The association's past work on open hearth operation, which led, among other things, to the development of single uptake furnaces, is being furthered at Sheffield on a model furnace operating at steelworks temperatures.

Automatic Gage Control—This subject has been under development by the metalworking division for some time, and the experimental four-high cold strip mill now available in the Sheffield laboratories will carry these investigations further. This is a high-speed reversible mill, with rolls of 14 inches face width, capable of a maximum speed of 1750 fpm with 7-inch diameter rolls.

Complete tension control is possible and, for a given setting, tensions are kept constant during acceleration, deceleration, and change in coil diameter. This control with a roll force meter has been demonstrated on a 10-inch by 10-inch two-high mill, and strip was held to within +0.0001 inch at all speeds from 30 to 250 fpm.

Practical Application—A demonstration was repeated on the 56-inch 4-stand tandem cold reduction mill at John Summers and Son's works where strip was rolled consistently at all speeds to far closer tolerances than are at present possible without automatic gage control.

There are also other rolling variables, such as thermal expansion and bearing clearance, which may have to be considered and which threaten to increase the complexity of the equipment needed.

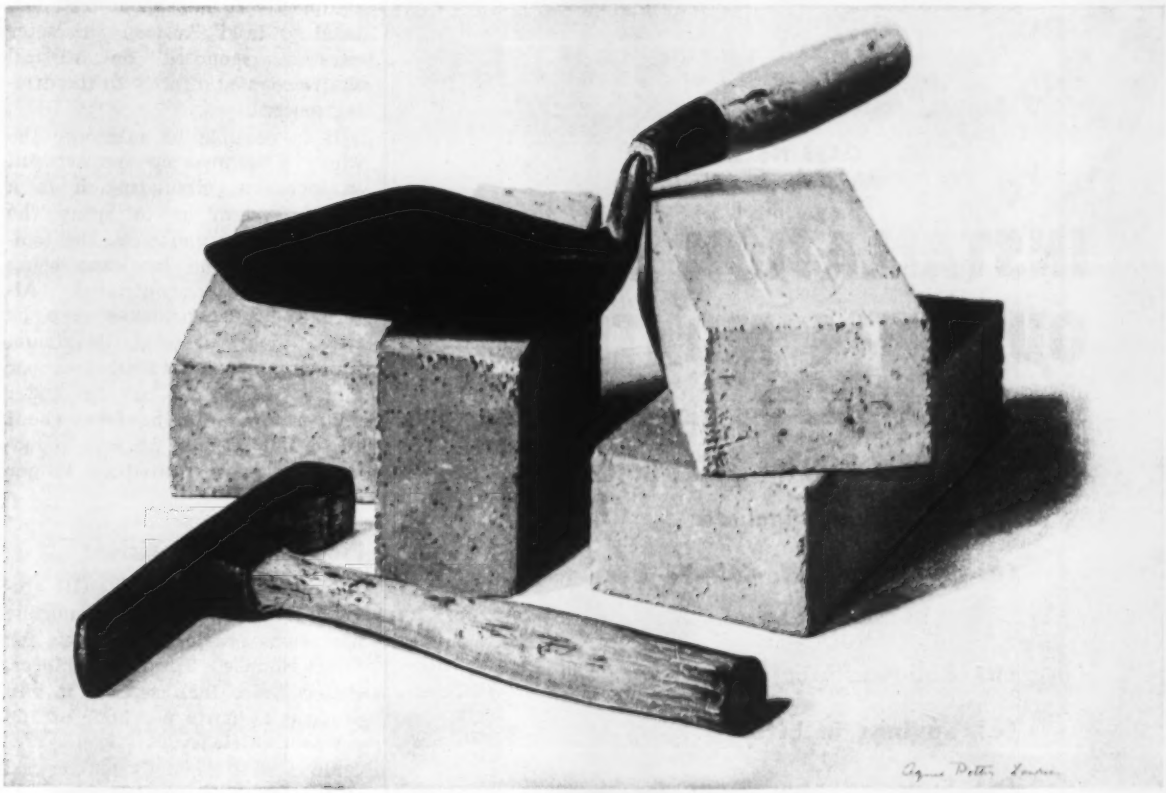
Wire Drawing—Another team at Sheffield is engaged on the problems of heat and lubrication in high-speed wire drawing, exploring the factors responsible for these and seeking ways of reducing heat generated in the die and of more efficiently removing heat that cannot be suppressed. These investigations are seeking data of surface heat produced in relation to speed and wire size, and the role of die cooling and of the thermal properties of die and wire.

To this end, devices have been built for measuring the proportion of heat extracted by the die, the surface temperature of the wire at any point between die and drawing block, and the temperature of the die-wire interface close to the exit from the die.

Wire Lubrication—The mechanism and application of lubrication in wire drawing is also under investigation, with work undertaken on improved methods of applying the lubricant—for example, by electrode position from solution on to the moving wire. This, it is hoped, will give a more consistent lubricant film thickness and so a more uniform die performance.

A technique of measuring the thicknesses of lubricant films by measurement of the electric resistance of the die-wire interface has been developed. This resistance has been found to be much larger than would be expected, if the film were only a few molecules thick. It oscillates rapidly between extreme values and appears to be markedly dependent on speed, increasing with the increased rate of drawing.

Different Die Profiles—For this work the Sheffield laboratories are proceeding with high speed tests and work with die profiles radically different from conventional ones. This is made possible by the two-hole, straight-line, machine with which they are



"Lining for the Furnaces" by Agnes Potter Lowrie, famed artist daughter of a noted steelmaker. In this second of a specially commissioned series, Mrs. Lowrie captures the deceptively soft, seldom seen texture of refractory brick so rugged it can withstand months of searing 3000° temperatures . . . Limited edition of 15 x 18 color prints available. Complimentary copy sent upon request.

The Fine Art of Steel Making * II

Whether it's building bridges or bombers, skyscrapers or pipelines . . . when America grows, it calls on steel. Year after year the industry has met the demand for more steel, better steel, faster and more efficient production. Today's speedy, almost automatic four-high mill, for instance, rolls in a single 8-hour shift more steel than the old-time hand mill produced in a week.

As the mechanics of steel making improved, so have the materials which smooth the process — Ironsides roll neck and roller bearing lubricants.

Roll neck shield, once applied by hand, is now supplied in liquid and semi-liquid form for continuous application by automatic pressure systems. Roll necks may be kept at constant temperature; the roller need not adjust his mill to maintain proper gauge.

More important, roll neck shield is formulated to the special needs of the individual user. For example, to compensate for local water and temperature conditions or to meet personal preferences of mill superintendents.

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Today almost every major steel producer is a user of Ironsides lubricants. Our unique position in the industry is due to our ability to formulate for individual applications and supply those special formulas in any quantity.

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equipped. It has spool feed and take-up, and 18-inch diameter capstans mounted on vertical shafts coupled directly to the driving motors.

It is possible to submerge the whole of the drawing compartment in lubricant, circulating it in a closed system or to spray the capstans, dies and wire, the temperature of the lubricant being thermostatically controlled. Alternatively, soap boxes may be fitted for dry drawing. Maximum finishing speed is 5000 feet per minute. Drawing can be under temperatures ranging from about 10 to 130° C with an area reduction per pass from 0 to 45 per cent.

Processing Diesel Pistons

New hydraulic-feed 85 HH single-end machine performs multiple operations on floating pistons for diesel engines. The manufacturer, Baker Bros. Inc., reports it will produce 41 parts per hour at 100 per cent efficiency.

Mounted to a heavily-constructed well-ribbed steel end bed is a floor type unit having 30 inches width of hardened steel ways in 60-inch length of saddle with automatic lubrication for saddle, ways and gibs. It has an available feeding pressure of 23,500 pounds, is equipped with an Oilgear variable delivery pump base mounted with ample oil sump and with spindles of the quill type.

Copper, Copper-Alloy Specs

Five types of copper, copper-alloy-covered and bare electrodes are prescribed in "Specifications for Copper and Copper-Alloy Welding Electrodes" issued by American Society for Testing Materials and American Welding Society. This edition was prepared primarily to standardize the electrodes used in inert-gas metal-arc welding.

Filler metals covered include copper, copper-silicon, copper-tin, copper-nickel and aluminum bronze. A table gives the chemical analysis of different classifications in each group and tests for verifying conformity of a given electrode to the standard requirements.

Copies may be secured from ASTM, 1916 Race St., Philadelphia, or AWS, 33 W. 39th St., New York 18, for 25 cents.

CALENDAR
OF MEETINGS

July 11, National Association of Metal Finishers Inc.: Annual meeting, New York. Association address: 2117 Le Roy Place, N.W., Washington 8, D.C. Executive secretary: Raymond M. Shock.

July 12-15, American Electroplaters' Society: Annual convention, Hotel Statler, New York. Society address: 445 Broad St., Newark 2, N. J. Executive secretary: Peter Kovatis.

July 13-15, Western Plant Maintenance Show & Conference: Pan Pacific Auditorium, Los Angeles. Information: Clapp & Poliak Inc., 759 Monadnock Bldg., San Francisco 5.

July 22-23, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington 4. Managing director: John B. Hulse.

August 2-4, National Tool & Die Manufacturers Association: Board of trustees and committee meeting, Grand hotel, Mackinac Island, Mich. Association address: 907 Public Square Bldg., Cleveland 13. Executive secretary: George S. Eaton.

August 8-12, American Society of Sanitary Engineering: Annual meeting, Muehlebach hotel, Kansas City, Mo. Society address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

August 16-18, Society of Automotive Engineers Inc.: National West Coast meeting, Hotel Statler, Los Angeles. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 25-27, Western Electronic Show & Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Business manager: Mal Mobley Jr., 344 N. La Brea Ave., Los Angeles 36.

August 30-September 3, Automotive Electric Association: Annual fall meeting, Vanss Springs hotel, Vanss Springs, Alberta, Canada. Association address: 802 Michigan Bldg., Detroit. Executive secretary: S. W. Potter.

September 1-16, International Electrotechnical Commission: Golden jubilee meeting, University of Pennsylvania, Philadelphia. Information: D. E. Denton, Public Relations Dept., American Standards Association, 70 E. 45th St., New York 17.

September 4-8, Pressed Metal Institute: Annual fall meeting, Manoir Richelieu hotel, Murray Bay, P.Q., Canada. Institute address: 2860 E. 130th St., Cleveland. Managing director: O. B. Werntz.

September 7-9, Industrial Truck Association: Fall meeting, Greenbrier hotel, White Sulphur Springs, W. Va. Association address: Washington Loan & Trust Bldg., Washington 4. Secretary: William Van C. Brandt.

September 7-9, National Fluid Power Association: Fall meeting, Hotel Commodore, New York. Association address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

September 8-10, American Society of Mechanical Engineers: Fall meeting, Schroeder hotel, Milwaukee, Wis. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

September 8-10, Porcelain Enamel Institute Inc.: Shop practice forum meeting, Urbana-Lincoln hotel, Urbana, Ill. Institute address: 1346 Connecticut Ave., N.W., Washington 6.

September 10-11, Metal Powder Association: Fall closed meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

September 11-14, Packaging Machinery Manufacturers Institute: Annual meeting, Grove Park Inn, Asheville, N. C. Institute address: 342 Madison Ave., New York 17. Secretary: Miss Helen L. Stratton.

September 12-15, National Metal Trades Association: Eastern plant management conference, Sagamore hotel, Lake George, N. Y. Association address: 122 S. Michigan Ave., Chicago 3. Secretary: Charles L. Blatchford.

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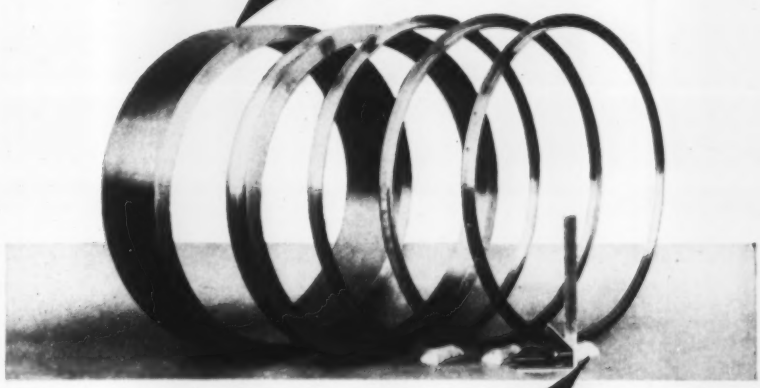

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X-RAY DIFFRACTION TAKES A FRESH LOOK AT

Fig. 1—Cobalt Kα radiation at 14,000 psi, 310 line. Exposure time was 180 m.p. hours

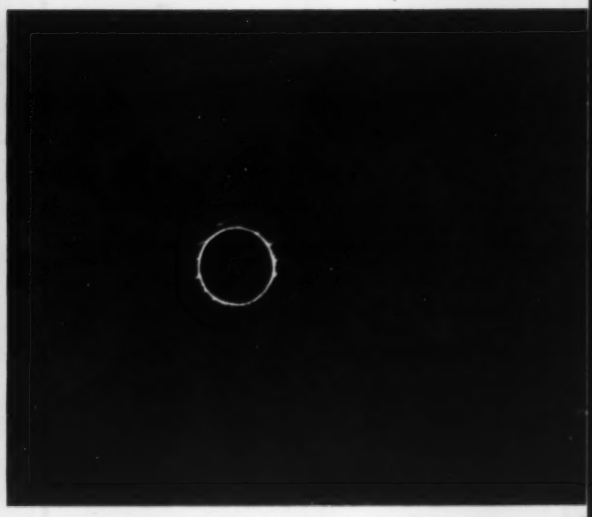


Fig. 2—Same sample at 43,000 psi—as seen under the same radiation and exposure time

Yield Point In Metals

Until the x-ray method evolved, metallurgists could only speculate on what happened at the yield point. Now they have a clear picture of the deformation mechanics

By NORMAN P. GOSS
Consultant
Cleveland

X-RAY diffraction methods have given a much clearer picture of the deformation mechanism as a metal passes through the yield point. In fact it remained for the x-ray diffraction methods to reveal the changes which occurred at the yield point.

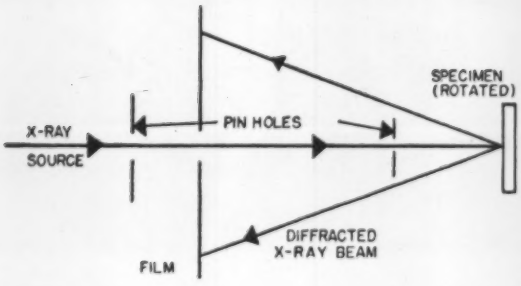
Metals can be deformed elastically, or plastically. When stressed elastically, metal does not experience a permanent set, in that it will return to its original state when the stress is released. Plastic flow begins as soon as the yield strength of the metal has been exceeded, and imparts a permanent set to the metal.

Below Yield Point — When a metal is stressed just short of the yield point, no visible changes can be observed in the x-ray diffraction patterns. An annealed specimen examined without being stressed exhibits the same x-ray diffractions as when stressed just below the yield point. The structure of a strip of low carbon steel stressed just below the yield point is shown in Fig. 1. This x-ray pattern was made by reflecting the Kα radiation of cobalt, from the surface of the specimen while subjected to a stress of 40,000 psi using the arrangement shown in Fig. 2.

In spite of the stress, which is just short of the yield strength, the diffraction spots are sharply defined and have great intensity. The elastic deformation has not been sufficient to reduce the intensity of the diffraction spots appreciably.

Further Stress—The test specimen was then stressed to 43,200 psi without altering its position in the specimen holder (the specimen holder was a small spring loaded tensile machine mounted on the x-ray diffraction unit). The x-ray patterns after stressing just beyond the yield point are shown in Fig. 3.

Low spots so sharply defined in figure 1 are now completely obliterated, and the intensity of the (310) doublet line is greatly reduced. The exposure time of these x-ray patterns was the same, and they are therefore comparative. In passing through the yield point the grains of the metal are



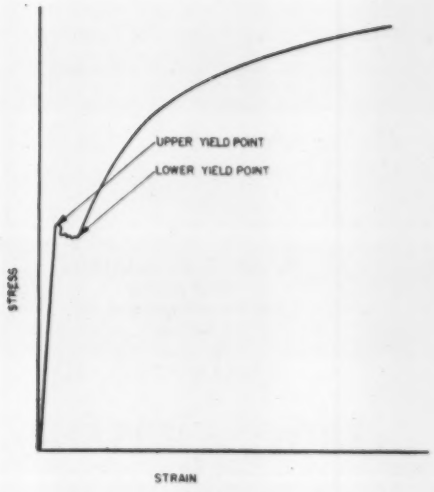


Fig. 3—Diagrammatic sketch of back reflection setup shows positions of sources and sample. Fig. 4—Curve shows yield point elongation between upper and lower yields

fractured into countless smaller grains called crystallites. Cohesion of these fragments remains intact; to cause further flow requires a greater stress. A plastically deformed grain is no longer a single grain but an aggregate of smaller ones, displaced and joined together, by atomic forces, of which the valence electrons play the major role.

Upper and Lower Yields—Stress at which a metal continues to flow at constant load is referred to as the yield point elongation. This is usually well defined on the stress-strain diagram of mild steel (see Fig. 4). One of the interesting peculiarities is the so-called upper and lower yield point, quite characteristic of annealed low carbon strip steels. The lower yield point is at slightly lower stress (about 2 per cent less) than the upper yield point, and plastic flow continues at constant stress.

Upper yield stress is influenced by the rate at which the load is applied. When the loading is rapid, the yield point may nearly equal the ultimate stress. Careful experiment has definitely established the fact that the upper yield is characteristic of the metal and not due to the inertia of the testing machine.

Characteristic — The yield at constant load is quite characteristic of all annealed, dead-soft, low carbon steels. However, it may at times also be found in some nonferrous metals, as alloys of nickel and copper. No evidence of yield point elongation has been found in duraluminum, though one may be found if tested at the proper temperature.

It is also of interest to note that yield elongation is not found in pure iron when tested at room temperature, nor is it found in steel having a higher carbon content.

Affect of Carbon—It seems that a small amount of carbon, say 0.05 to 0.08 per cent, imparts to annealed strip steel a well defined yield elongation, though other elements may also be a contributory factor.

It is believed[1] that the grains of ferrite are enveloped by an extremely thin film of hard carbide. These boundary films of carbide enable the ferrite grains to support a stress in *excess* of the force required to cause slip, with the result that the deformation does not begin until the carbide envelopes surrounding the grains are fractured.

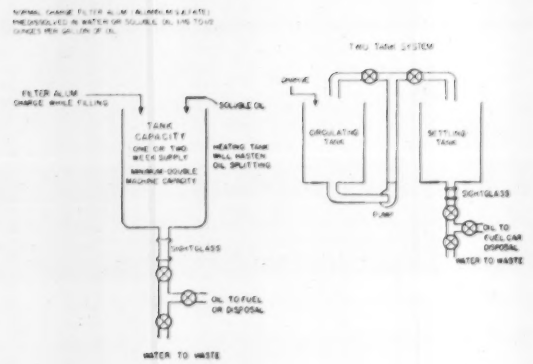
Best Answer — The flow is initiated at the upper yield point, but continues at the lower yield point at constant stress. While this may not be the ultimate explanation, it does have merit and is the best offered so far in that it logically accounts for the upper and lower yield point. Any explanation must, indeed, take into consideration the effect of grain boundary support, the inherent sub-boundary structure of the grains, i.e. the crystallites cannot be fragmented without limit, and some type of dislocation structure, associated with the imperfections of the grains.

It may be of interest to relate the excellent research of Edwards, Phillip and Lui[2] on the yield point of nonferrous metals. Appearance of the yield point depends upon how the metal is heat treated. It is found in test pieces quenched from 300°C, but not in specimens cooled slowly from 700°C. However if this slow anneal is followed by straining and tempering, a well defined yield is developed.

Their Opinion—These investigators are of the opinion that the yield point is due to precipitation of a finely dispersed phase upon the slip planes rather than a separating out of another constituent. While the results for the copper-beryllium alloy are in many respects similar to low carbon steels, there is one difference. The low carbon steels show a yield elongation when cooled slowly from 1350°F, while the copper beryllium alloy cooled in the same way does not.

1. Plasticity, Nadai, McGraw-Hill, 1931, New York.
2. Yield Point In Steel, Iron & Steel Institute, preprint, Jan., 1943.

By MR. E. E. McCLUNG
Chief Chemist
Van Straaten Chemical Co.
Chicago



Van Straaten Chemical Co.'s Soluble Oil Disposal System

Keep Waste Disposal Within Local Limits

INCREASING LEGISLATION against stream pollution forces more and more industries to face the question: How can we dispose of soluble oil wastes effectively?

The problem is severe because most ordinances permit only an extremely small amount of oil in wastes. Tolerances may range from only 30 to 50 parts per million of mineral oil in all sewage waste. This low tolerance eliminates the possibility for most plants of disposing soluble oil wastes through the sewage disposal system.

Roughly, flushing the oil wastes through the sewage disposal system in an effort to dilute the oil wastes would require about one million gallons of water for every drum of oil wastes. Thus dilution, in most instances, is not feasible or economical.

Separation — Therefore, disposal must be made on the basis of separating the oil from the water. Oil may either be sold to scrap oil dealers, may be used for dust control of roads and plant areas or may be burned.

Splitting the oil wastes into water and oil is accomplished chemically. Chemical used for the splitting should not in itself add to the pollution problem. For instance, calcium chloride can be used as a splitting agent, but some stream pollution laws require a relatively low chloride concentration. Therefore, calcium chloride is not recommended.

For this reason, aluminum sulphate has been generally used as the splitting agent. It is inexpensive and effective not only because it is a slightly acid salt, but because the aluminum combines with soaps present in the oils to produce insoluble soaps.

Two Systems — The diagram shows two systems for handling waste disposal. One is a single tank system, the other a two-tank system. Former has a disadvantage in that the aluminum sulphate must be dissolved prior to addition of oil. This can create a handling problem.

In th two-tank system, aluminum sulphate and waste oil can be circulated and aluminum sulphate can be dissolved thoroughly in the first tank. In the second tank, settling takes place. In either single or double tank systems it is important to allow a minimum of 24 hours of undisturbed separation time. Maximum practical separation can be obtained in a week.

Concentration of aluminum sulphate will be dependent upon stability of the soluble oil and will range up to ½ ounce per gallon, depending upon mixture and make-up of oil. A mixture of ½ ounce per gallon will cause a split to occur within 24 hours, and generally is recommended.

By using a sight-glass connection, it is possible to separate the water from the oil phase.

Other Factors—In some cases, it may be desirable to control the pH of the waste water. With aluminum sulphate, pH would range from 3.5 to 5. Generally, this is not acid enough to seriously affect iron connections in the waste system.

If neutralization is desired, then it must be carried out after the water has been drawn from the settling tank. Soda ash is usually recommended for neutralization. If a neutralizing agent is added before the water is drawn off, it can partially restabilize the emulsion and raise the oil content in the split water phase.

Results — Using the aluminum sulphate method, it is possible to reduce concentration of oil content in the water waste down to 88 parts per million. In some cases this may not be within tolerances specified for the total oil content allowed in sewage waste of a plant. This can be handled by further metering in other nonoily plant waste along with the waste from the soluble oil disposal system until the proper ratio is obtained.

For example, if the permissible oil content in waste for one sewage setup is 40 parts per million, then metering the soluble oil wastes into the other plant wastes at approximately equal parts would reduce it to permitted level.

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NEW PRODUCTS and equipment

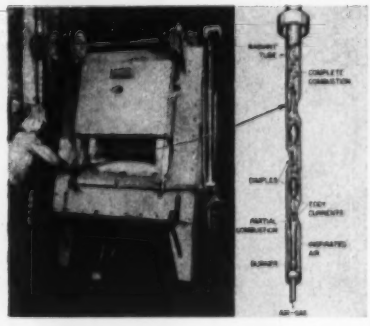
Reply card on page 95 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Atmosphere Box Furnace

. . . gas fired, radiant tube

This gas-fired radiant tube atmosphere furnace is suited for heat treating almost all production and tool steels, except high-speed where it is essential to keep the work scale and decarburization free.

Design makes it possible to suspend the tubes along the sides of



the furnace chamber. They are made of thin walled tubing and inconel. Tubes give maximum heat transfer rate through the tube wall and minimum internal tube temperature for long life. All tubes are fired at the lower end and are readily removable through the furnace arch without the need for cooling the furnace or interrupting operations. Lindberg Engineering Co.

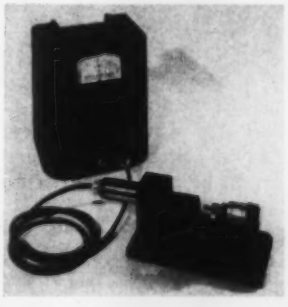
FOR MORE DATA CIRCLE NO. 1 ON REPLY CARD

Electric Micrometer

. . . reads to 0.00001 inch

A standard electronic amplifier and gage head cartridge are combined with a standard indicating bench micrometer which will measure small parts to 0.00001 inch at magnification of 18,000 times.

A frictionless member supported by parallel reeds transmits motion from the anvil to gage head cartridge and the micrometer head set to required 0.0001-inch. Measuring pressure is adjustable from



3 ounces to 2½ pounds when used at 0.0001-inch sensitivity, making it possible to use a measuring pressure suited to requirements of work. It is particularly adapted for measuring fine magnet wire, small screw machine parts, pivots, etc. Brown & Sharpe Mfg. Co.

FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Feed, Speed Chart

. . . reference for drilling

A helpful chart for safe feeds for high speed drills is 8¾ x 11⅛ inch. It shows drill diameters and safe feeds for cast iron, bronze, brass, drop forgings annealed, drop forgings heat treated, steel castings and mild steel. Chicago Latrobe, Division of United Drill & Tool Corp.

FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Rotary Table

. . . is portable attachment

Vulcan Rotary Table uses regular air line sources for power and attains variable speeds of 40 to 100 rpm. It is an inexpensive portable attachment for the surface grinding of flanged studs or bushings, bearing spacers, forming rolls, convex or concave surfaces, flush pin gages, punches or dies.

Tables available are 6 and 10 inches in diameter. With the table only the machine cross feed is used. Such a table can be used on a sine plate or angle fixture utilizing a standard surface grinder

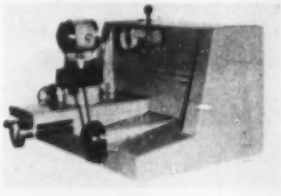
wheel. It can be used with standard permanent magnetic chucks or simple fixtures to suit the part. Vulcan Tool Co.

FOR MORE DATA CIRCLE NO. 4 ON REPLY CARD

Tool, Cutter Grinder

. . . eliminates usual tables

Model RK-2 tool and cutter grinder holds work stationary while grinding wheel moves, eliminating the usual tables and mak-



ing possible a compact machine with all controls grouped within easy reach.

The grinding wheel spindle

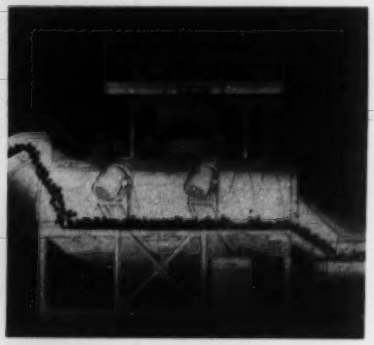
floats on totally-enclosed, anti-friction bearings. Standard equipment includes workhead, centers and universal vise. Grinder will handle cutters up to 14 inches in diameter. McDonough Mfg. Co.

FOR MORE DATA CIRCLE NO. 5 ON REPLY CARD

Barrel Cleaner

. . . high cleaning capacity

Type GO Continuous-Flow Roto-blast cleaning barrels ranging from the No. 1 having a 48-inch diameter drum to the No. 5 with a 72-inch diameter drum are best



suited to heavy volume cleaning operations for maximum economy because of their high cleaning capacity.

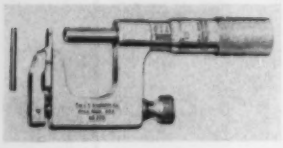
An important factor in their operation is the abrasive separation system. They are equipped with abrasive reclaiming systems which thoroughly clean the abrasive for re-use, retaining full blasting efficiency, discarding all fines and other refuse. Pangborn Corp.

FOR MORE DATA CIRCLE NO. 6 ON REPLY CARD

Micrometer

. . . with changeable anvils

Multiple interchangeable anvils are features of the Mul-T-Anvil micrometer. Two anvils are furnished, a rod anvil which is useful



for measuring from a hole to an edge and a flat anvil for measuring distances from the inside of slots and grooves to an edge.

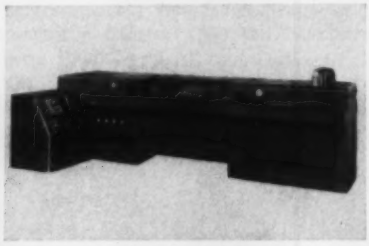
Micrometer features a vise type frame which holds the interchangeable anvils. It has a range of 0 to 1 inch and reads in thousandths. L. S. Starrett Co.

FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

Decorating Machine

. . . electric, automatic spray

An all-electric automatic spray decorating machine with an integrated mask washer accommodates the spraying of small parts,



or pieces up to 24 inches and 7 inches in width. The operator throws a switch and immediately clean masks are shuttled into position for painting.

Mask washing continues even though the painting operation is temporarily suspended, making sure that masks are clean when work is resumed. The wash cycle is dial controlled up to 2 minutes. Wash pattern is flexible and adjustable. Conforming Matrix Corp.

FOR MORE DATA CIRCLE NO. 8 ON REPLY CARD

Mold Conveyor

. . . requires no lubrication

Featuring articulated connections between the cars and internal type takeups, the Jeffrey univer-

sal mold conveyor requires no lubrication. It is equipped with permanently-lubricated ball bearings and oil impregnated bushings. Cars of malleable iron chassis, with chilled-iron, flangeless wheels are equipped with easily changed tops which can be steel, cast iron, roller or hinged for automatic discharge.

No sliding of wheels takes place since the wheels are always radial to the curves. Internal takeups on each car eliminate expensive foundations and cumbersome sliding-track take-ups. Jeffrey Mfg. Co.

FOR MORE DATA CIRCLE NO. 9 ON REPLY CARD

Cement Bonded Sand

. . . core without box, arbors

Use of cement bonded sand made possible a large core for a 48,000 pound iron casting for an exhaust casing without the use of the customary core box or use of arbors. Outside mold was lined with a layer of sand the exact thickness desired for the casting walls.

Natural hardening of the cement bonded sand and its high

strength made it possible to produce the core with a minimum of internal reinforcing and no special equipment. Chambersburg Engineering Co.

FOR MORE DATA CIRCLE NO. 10 ON REPLY CARD

Plating Equipment Exchange

. . . helps keep shops modern

A complete new service is being provided for metal treating departments. It consists of an exchange where idle metal treating equipment can be exchanged for needed items, or batch machines can be replaced with modern, continuous ones.

The company rebuilds, sells, and

DIE STRAIGHTENING

COINING • SIZING • EMBOSSING

Call for H-P-Ms

Versatile, rapid cycling, all-hydraulic H-P-M single action presses are ideally suited to a wide range of mass production jobs — straightening castings, coining, sizing, embossing, forming, drawing, assembling and many more. Automatic controls insure uniform results. Talk to an H-P-M engineer today about cutting your production costs!

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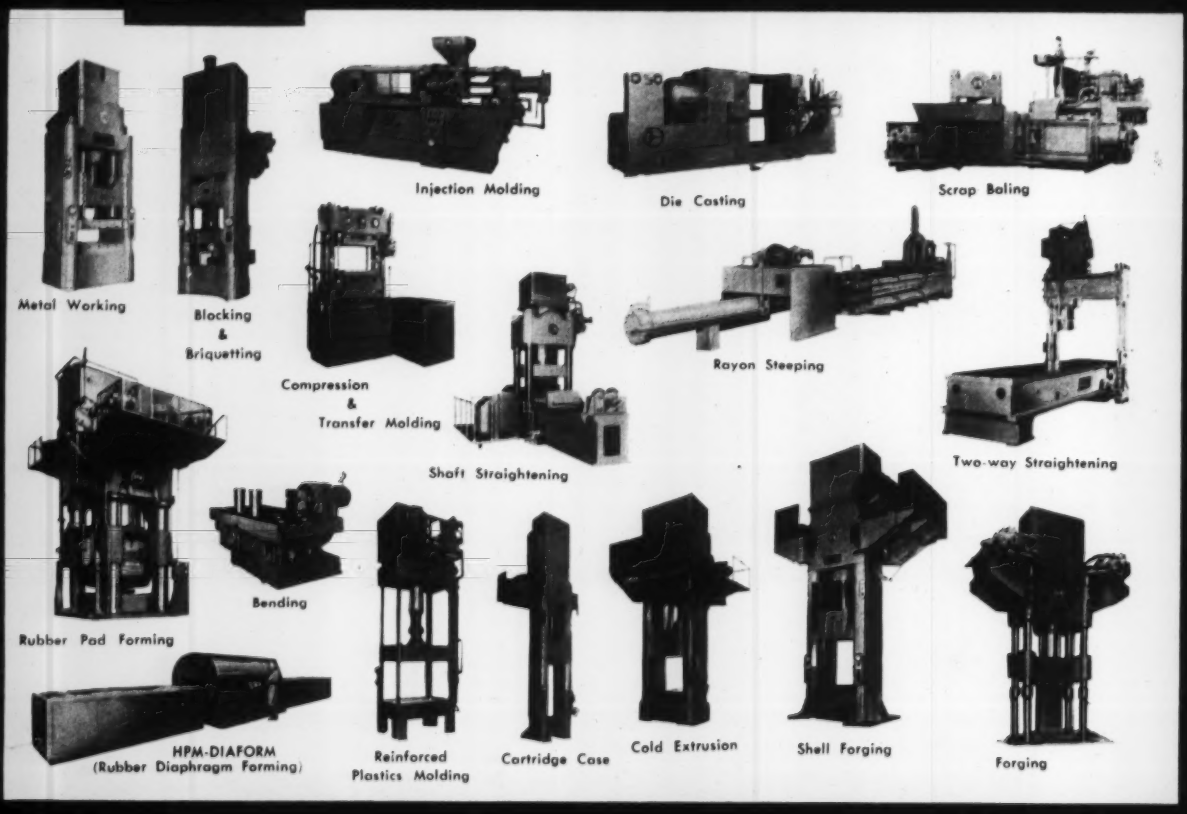

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VALVES
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Complete power packages for every application.

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Items to complete that hydraulic circuit.

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TEANECK, N. J.
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Quinn, McKerall & Quinn
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Austin Hastings Co., Inc.
DALLAS, TEXAS
Tri-State Machinery Co.
DENVER, COLORADO
The Mine & Smelter Supply Co.
HOUSTON 2, TEXAS
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KANSAS CITY, MISSOURI
Blackman & Nuetzel Mach. Co.
LOS ANGELES 11, CALIF.
Machinery Sales Co.
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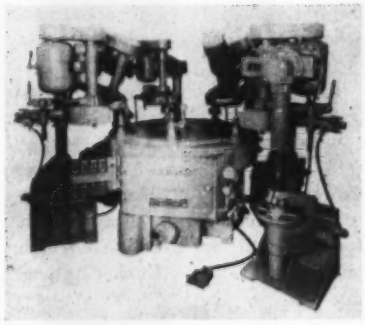
modifies heat treating, melting, plating and cleaning equipment. They have available an excellent selection of used units. Metal Treating Equipment Exchange.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

Finishing Machine

. . . dwell period adjustable

A larger rotary automatic indexing, polishing and buffing machine, known as the model K-62-7, will accommodate up to six head and stand units. The indexing turret is 62 inches OD and 42 inches high. It operates on a constant



high speed index movement of one second and has an adjustable dwell period.

Table and work spindles are driven by a ¾-hp motor and have variable speed of 15 to 45 rpm or 50 to 150 rpm. Spindles operate entirely independent of the indexing operation of the machine. Hammond Machinery Builders Inc.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

Industrial X-ray

. . . fast, reliable inspection

The MG 60 fluoroscopy and radiography unit for industrial inspection, production control and scientific purposes developed by

the Research & Control Instruments Division is self-contained, lightweight and portable. It's applicable for examination of objects made from light metal, rubber, plastics, porcelain and glass. The unit detects metallic foreign matter, locates contact parts and connectors in insulating materials and helps in the control of fabric layers in rubber.

Designed for continuous operation, the x-ray tube has a small focal spot providing excellent radiographic and fluoroscopy box. North American Philips Co. Inc.

FOR MORE DATA CIRCLE NO. 13 ON REPLY CARD

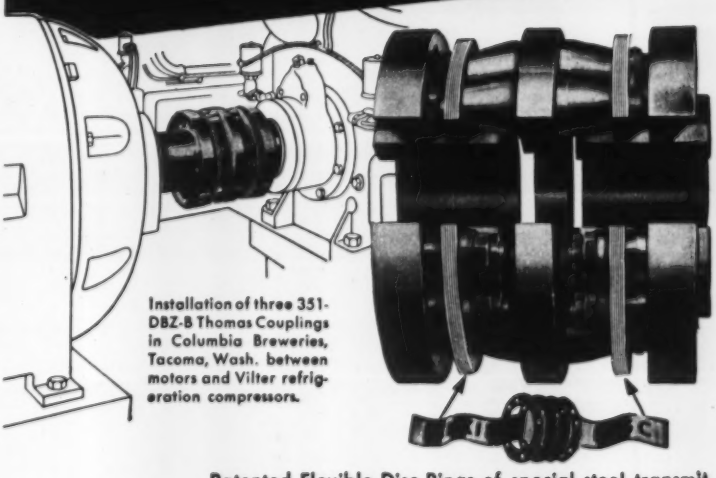
Welding Water Saver

. . . conserves automatically

The T-W water saver was developed to provide greatest over-all degree of total water conservation resistance welders and is proving useful in preventing excessive condensation. It can be used with old or new welders and can be built into the equipment.

In operation the control is automatic, starting the water flow as

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!



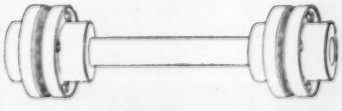
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.

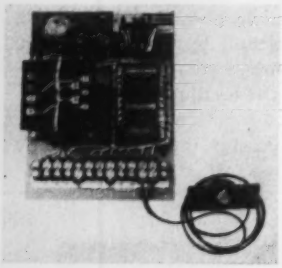


Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

soon as the welder begins a sequence. The electrical signal for the control comes from the welder air valve in most applications, although the control may be used



with any type of welder where a solenoid valve, or other electrical circuit, is energized for each of the operating cycles. Taylor-Winfield Corp.

FOR MORE DATA CIRCLE NO. 14 ON REPLY CARD

Pattern Selector

. . . gives complete specs

This pattern selector gives complete specification data on 26 Rigid-Tex metals patterns. A turn of the wheel shows an actual photo of each textured metal pattern

with an arrow indicating direction of width. A cut-out window gives pattern number, width, thickness and depth automatically as the pattern is dialed.

Uses for the metals are suggested on the back. Rigidized Metals Corp.

FOR MORE DATA CIRCLE NO. 15 ON REPLY CARD

Featherweight Material

. . . compressed synthetic fibers

Mistlon, a featherweight nonwoven material is composed of millions of tightly compressed synthetic fibers. It is neither paper nor cloth, but has many of their characteristic properties.

The material should find use as an inner lining for fiberboard shipping containers; as wrapping for delicate instruments; as protective covering between sheets of stainless steel. It is available in roll form in any lengths, in widths up to 54 inches and in 22 solid and pastel colors. Sample swatches available on request. Minnesota Mining & Mfg. Co.

FOR MORE DATA CIRCLE NO. 16 ON REPLY CARD

Sheet Metal Brake

. . . for true radius bends

A hand-operated, universally-adjustable sheet metal brake capable of forming virtually any shape has

been introduced by R. E. Smith, Waukegan, Ill. It is compactly built, occupying only 30 x 40 inches of floor space and accommodates 18-gage sheets up to 26 inches wide.

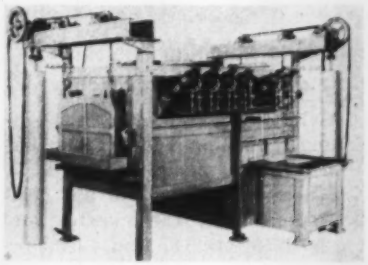
Accurate radius bending is possible on the brake. Center line of the segmented upper mandrel fingers is always on the center line of the hinges. True radius bends are insured, regardless of thickness of metal being formed. Adjustments at the hinges quickly and easily change the distance of the lower anvil fingers from the center line. R. E. Smith.

FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

Aluminum Melting Furnace

. . . gas, oil or both

A dry hearth double-chamber aluminum melting furnace consists of separate melting and holding baths in a single unit, thus eliminating use of containers. The furnace has a high melting rate and uniform pouring temperature. Hearth in melting area is designed



to allow molten aluminum to flow into the holding compartment. Two dip vestibules permit easy dipping.

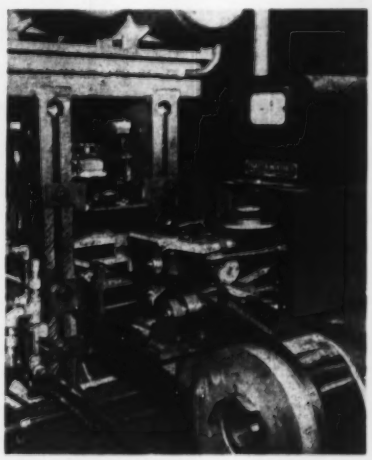
Burners are mounted so products of combustion have improved contact with the metal without flame impingement. Furnaces are available in 12 standard sizes up to 2000 pounds per hour capacity for gas, oil or combination gas-oil firing. Eclipse Fuel Engineering Co.

FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Conversion Service

. . . stock in coils, straight

Facilities are available for immediate handling of reroll or conversion requirements. Materials presently being cold rolled include



copper, brass, phosphor bronze, beryllium copper, stainless steel, titanium and zirconium. In addition, strip can be slit, straightened, leveled and cadmium plated.

Finished stock can be supplied in

Photo T-4938 Handling one-ton packs of 26-gauge silicon steel sheets size 34" x 121" with inexpensive handpropelled Cleveland Tramrail crane and electric hoist.

TRAMRAIL System Cuts Sheet Steel Handling Time 37½%

STUDIES by Sangamo Electric Company, Springfield, Illinois, makers of precision electrical measurement instruments, revealed that even though their finished products are light in weight, materials handling amounts to a substantial percentage of the total factory payroll. Well over ⅓ of their handling costs is for raw material handling.

With a postwar production rate double that of prewar, it has been necessary for Sangamo to improve methods and purchase equipment to move greatly increased volumes of materials with a minimum addition of building and labor. A Cleveland Tramrail system for handling steel sheets in their receiving department, was one of the two most outstanding additions in this program made during 1948.

The Cleveland Tramrail system has reduced worker fatigue and accidents and has directly resulted in the saving of 12 manhours for every 70,000 lb. car of sheet steel unloaded. Whereas this job formerly required 32 manhours, it is now done in 20—a 37.5% reduction in time.

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THE CLEVELAND CRANE & ENGINEERING CO.
7859 East 284th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

It takes a fourth

Whether you're playing bridge, or playing for higher stakes in business, it takes a *fourth.*

Financial, production and engineering skills don't pay off unless they're backed up by the *fourth* skill—Distribution.

Nobody ever made money in the manufacturing business without that *fourth* skill, which includes sales effort.

Sometimes management loses sight of this. It talks of production at a profit, and yet there is no profit until goods are *sold.*

It would never think of withholding power that is needed to get the most out of plant capacity. And yet it frequently holds back on the power of advertising when it is needed most to help Distribution maintain sales and profit levels.

Today there is new thinking at the management level in many companies. Distribution is getting priority. The old question "How much can we *save* on advertising?" is being replaced by "How can we find *more* jobs that advertising can do *to increase sales effectiveness?*"

Have you ever put the question to your advertising agency *that* way? Try it. Theirs is the *fourth* skill.

THE PENTON PUBLISHING COMPANY

PENTON BUILDING • CLEVELAND 13, OHIO

coils or straight lengths, while certain materials can also be continuously or strand annealed in controlled atmosphere equipment. Sizes are governed by alloy and temper. Penn Precision Products Inc.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

Patching Compound

. . . for interior floors

This repair and patching compound makes it possible to repair cracks and holes in interior concrete floors quickly and permanently, with practically no interruption of plant production or materials handling.

Kwik-Roc, supplied in powder form, is simply mixed with water,

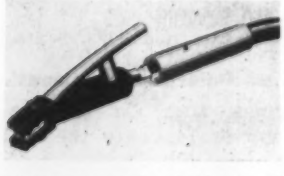
poured into the cleaned out hole or crack and leveled with the surrounding floor. Normal traffic may be resumed over the repaired area within 45 minutes after pouring. Sun Chemical Corp.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Electrode Holders

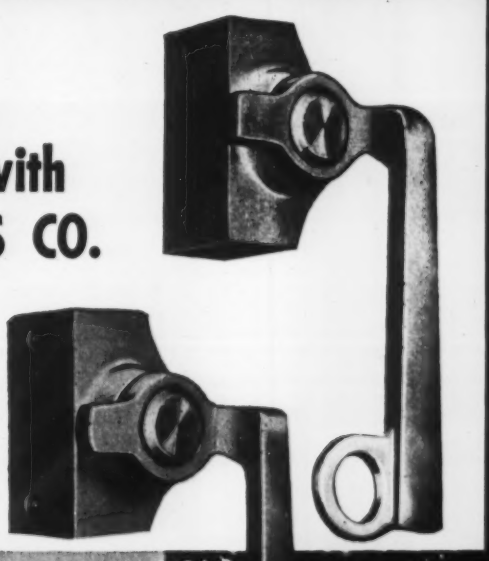
. . . with double-cam design

Two quick-disconnect welding electrode holders announced by the Cam-Lok Division are reported to eliminate need for whips, whip



ends or any mechanical or solder-holder connections. A built-in cable connector permits them to connect to any cable end by adding

put real sales appeal in your products with MUELLER BRASS CO. forgings



Windows in this modern new Florida hospital supplied by Valley Metal Products Co.—subsidiary, Mueller Brass Co.

The aluminum hardware used on all the windows in this modern hospital is a good example of the sales appeal that can be built into a product with Mueller Brass Co. forgings. These forgings are smart in design, practical in operation, and low in cost. They can also be produced in natural bronze or chrome finish depending on the desires of the architect or builder.

All Mueller Brass Co. forgings have a dense, close-grained structure with a high tensile strength. Weight savings up to 40% are possible in the design of parts because of the close tolerances to which they can be produced. Less scrap and longer tool life result from the easy machinability of forged parts. Mueller Brass Co. is completely equipped to produce brass, bronze or aluminum forgings to your specifications. For complete details, write us today.

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

125

a Cam-Lok female connector.

They are pug and straight-nose units. Offset jaws of pug nose holder permit holding rods in an infinite variety of positions. Double cam design guarantees perfect contact and a positive, vibration-proof connection. Empire Products Inc.

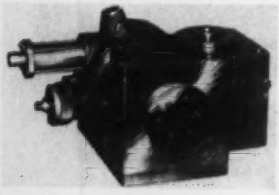
FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

Speed Indexer

. . . adjusts to loads

Designed to speed up and simplify accurate positioning, the Erickson multiple position indexer No. 477 indexes up to 500 positions depending on the gear ratio and index plate ordered.

A self-contained shock control unit assures positive, fast indexing.



The shock unit can be adjusted to meet varying loads. Indexer gear box turns on the indexer spindle so the indexer can be installed in four different positions for convenient work locations. Erickson Tool Co.

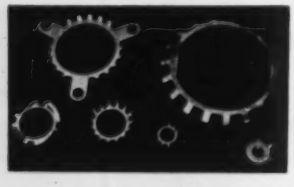
FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Custom Made Washers

. . . available in small lots

Special custom made die-cut lock washers in small lots, without cost of conventional blanking and piercing dies, can be produced by Dayton Rogers.

These special lock washers can be produced from practically any



sheet metal stock. Average die cost runs about 10 to 20 per cent of the cost of conventional tooling. Special lock washers for shaft sizes from 1/8 to 6 inches are available for all equipment installations. Dayton Rogers Mfg. Co.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 95 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Hydro-Broach Machines

Cincinnati Milling Machine Co. —An 11-page brochure covers their duplex vertical hydro-broach machines, includes a section on what you should know about surface broaching to gain full benefits of its possibilities. Advantages of the machines are given along with a description of their design, and specifications.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

Industry Switches

Minneapolis-Honeywell Regulator Co. — "Switches for Industry" covers 22 families of switches, describing 258 different switches, actuators and enclosures. Included in the 20 pages are dimensionalized photos, complete characteristics, electrical ratings and technical data, available from Micro Switch Division.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Junior Channels

Jones & Laughlin Steel Corp.— A booklet describing the use of J&L Junior Channels in stairway construction provides specifications and shows some of the buildings in which the channels have been used as stair stringers.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Copper Base Alloys

Pressco Casting & Mfg. Corp.— Die casting, permanent mold casting, semi-permanent mold casting and centrifugal casting of copper base alloys are covered in a 30-page book. Design, size limitation, tolerances, alloys, applications and general information are given.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CARD

Melting Handbook

Foundry Services Inc.—"Melting and Casting," a 55-page book, covers products and service for better castings at lower cost for aluminum and its alloys. A second booklet, "Foundry Practice, No. 1," deals with the basic facts of melting and casting metals, the troubles which arise and how they can be overcome.

FOR MORE DATA CIRCLE NO. 28 ON REPLY CARD

Cold Extrusion

Mullins Mfg. Corp. — Booklet gives examples of how certain tubular products are formed by Mullins' Koldflo method. It points out design possibilities of this process of moving steel in its cold state.

FOR MORE DATA CIRCLE NO. 29 ON REPLY CARD

Machine Tools

Hartford Machine Screw Co. — This company offers a 20-page booklet intended to tell prospective customers how, and under what circumstances, Hartford deserves to become a contract manufacturing extension of their own facilities. Contract automatic screw machining, secondary operation machining, heat treating, grinding services are covered.

FOR MORE DATA CIRCLE NO. 30 ON REPLY CARD

Moulding Machines

Vance Industries Inc. — Vance stainless steel mouldings and stainless steel sink frames are described briefly in a 4-page brochure. The advantages of their channel type counter moulding, reverse type cove moulding, and their sink frames covered.

FOR MORE DATA CIRCLE NO. 31 ON REPLY CARD

Spray Painting Equipment

Binks Mfg. Co.—Catalog 956 covers in 74 pages the complete line of Binks spray painting equipment. Its 1100 products and accessories have been classified into 11 sections for fast reference. Easy-to-read tables show correct

intricately machined MAX-EL alloy steel part shows minimum distortion after heat treatment...

Halliburton Oil Well Cementing Company, Duncan, Oklahoma, selected hot rolled MAX-EL 3½ bar stock for the valve shown. It's an important part of their 5⅞" tester, used to sample fluids or gases during drilling operations, sometimes 15,000 to 20,000 feet below the surface.

The valve is machined in the annealed condition and then heat-treated. Even though it varies considerably in thickness, no distortion problems are encountered in this MAX-EL part.

Try MAX-EL in your shop. You'll like its better machinability, freedom from distortion and over-all quality. And you'll get longer tool life . . . more pieces per grind. Call Crucible for immediate warehouse delivery of MAX-EL steels.

CRUCIBLE first name in special purpose steels

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fluid and air nozzles, air requirement and needle for each of a wide range of fluids.

FOR MORE DATA CIRCLE NO. 32 ON REPLY CARD

Polyester Film

E. I. DuPont de Nemours & Co. — "New Developments in Mylar Polyester Film" is published to report new applications for Mylar. Table of Contents for the first issue includes: Mylar Polyester Film; Recording Tapes; Electrical Installations; Drum Liners.

FOR MORE DATA CIRCLE NO. 33 ON REPLY CARD

Welding Book

Aluminum Co. of America — Latest developments in the science of welding aluminum are described by Alcoa in "Welding Alcoa Aluminum." 176 pages with photographs and drawings are coupled with comprehensive text to illustrate all the practical methods. Careful attention is devoted to quality control and safety.

FOR MORE DATA CIRCLE NO. 34 ON REPLY CARD

Productive Maintenance

General Electric Co. — "Five Steps to Productive Maintenance" provides detailed information on organizing to meet the demands that automation will make on electrical maintenance programs. Bulletin GEA-6087, 18-pages, discusses: Gathering equipment data; determining extent of routine maintenance; establishing a routine operating control system; evaluation for critical maintenance.

FOR MORE DATA CIRCLE NO. 35 ON REPLY CARD

Seam Welder

Sciaky Bros. Inc.—Complete specifications for the MP 2, air operated, press type, low impedance, single phase seam welder are given in Bulletin No. 321-7. Four pages list the important design features of the welder.

FOR MORE DATA CIRCLE NO. 36 ON REPLY CARD

Electric Installations

L. K. Comstock & Co. Inc.—A 44-page book, "Electrical Installations," illustrates and geographically describes many recent installations by this company.

FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Electronic Assemblies

John Volkert Metal Stampings Inc.—"Stampings for Electronics," a 20-minute color and sound motion picture, shows how Volkert

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INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

produces millions of precision parts daily for the electronics industry. Each department involved is shown making its specific contribution to the total job of volume stampings.
FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Facts About Oil

American Petroleum Institute—A new edition of "Facts About Oil," provides a reference booklet containing up-to-date statistics and other data on the petroleum industry. It's a 32-page booklet, liberally illustrated with photographs and line drawings.
FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Orinoco Project

Link-Belt Co.—Full story of the development of Orinoco Mining Co.'s rich Venezuelan iron ore deposit is authoritatively told in book No. 2509, "The Orinoco Project." Covered is detailed information on the 6000-gross-ton-per-hour ore handling system at Puerto Ordaz, Venezuela.
FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

Section Bearings

Kaydon Engineering Corp. — "Reali-Slim Bearings" includes descriptions of bearings with ¼-inch cross sections and ¼-inch width up to 12 inches ID. It includes other listings up to 1 inch cross section, width up to 40-inch ID.
FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Stock Sprockets

Morse Chain Co.—An 8-page catalog describes the newly expanded line of Morse taper-lock stock sprockets. Sizes and prices are given for ½, ⅝, ¾, 1, 1¼, 1½, 1¾ and 2-inch pitch type B stock taper lock sprockets with a hub on one side and for 1½, 1¾ and 2-inch pitch type C sprockets with a hub on both sides.
FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Sensitized Products

Frederick Post Co.—A booklet featuring Post's sensitized product line serves as a practical guide to the selection and purchase of reproduction materials and supplies. Dry or moist developed, blueprint, sepia tone and reproduction cloths and paper are covered.
FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Employee Relations

American Emblem Co.—A 16-page booklet, "Industry's Medals of Honor," is a manual of better employee relations through tested service award programs. It describes methods of setting up a service award program, choosing the design and a wide variety of presentations methods.
FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

Blast Hole Drill

Ingersoll-Rand Co.—The QM-2 Quarrymaster, a dual-purpose blast hole drill for either rotary or percussion drilling, is described in a 15-page bulletin. It tells the story of the QM-2 as a percussion drill, pointing up its features and uses. In-use pictures, dimensions, specifications and accessories are included.
FOR MORE DATA CIRCLE NO. 45 ON REPLY CARD

Investment Castings

Cadmet Corp.—A picture story of their method of investment casting is offered. Pages also include examples of mechanical properties attained by investment casting and some of the why's and wherefore's of investment castings.
FOR MORE DATA CIRCLE NO. 46 ON REPLY CARD

Work Gloves

Edmont Mfg. Co.—Industrial job-fitted work gloves are de-

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT	PAGE

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COMPANY _____

PRODUCTS MANUFACTURED _____

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4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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Readers Service Dept.

scribed and illustrated in a catalog directed to those interested in reducing time lost from hand injuries and cutting work glove costs. Advantages, types of coatings, specifications are given.
FOR MORE DATA CIRCLE NO. 47 ON REPLY CARD

Alloy Castings, Forgings

W W Alloys Inc.—Their premium quality alloy castings and forgings are described in a 6-page brochure which also lists qualities of the metals of the aluminum bronze series. Comparable aluminum bronze alloy specifications, applications for aluminum bronzes, typical properties of aluminum bronzes and typical properties of copper base alloys are included.
FOR MORE DATA CIRCLE NO. 48 ON REPLY CARD

Hydraulic Oils

Denison Engineering Co. — A catalog designed to aid consumers in making the proper choice of oils for Denison equipment contains 15 pages and stresses importance of selecting the correct oil for each operation. It is profusely illustrated throughout with photographs and charts.
FOR MORE DATA CIRCLE NO. 49 ON REPLY CARD

Vari-Speed Motor Drive

Reeves Pulley Co.—Catalog M-543 describes completely the new design of their fractional horsepower Vari-Speed Motodrive. It lists prices for all units, controls and modifications. Described is new exclusive threaded spiral groove lubrication.
FOR MORE DATA CIRCLE NO. 50 ON REPLY CARD

Stainless Steel Heads

G. O. Carlson Inc.—Information on press-formed and spun stainless steel heads has been prepared to consolidate important facts for engineers, designers, production and purchasing men who use these heads. Several reasons for selecting heads of stainless and a list of typical uses included.
FOR MORE DATA CIRCLE NO. 51 ON REPLY CARD

Overhead Handling

Cleveland Crane & Engineering Co.—Cleveland Tramrail Division's "Engineering and Application Data" has been revised and incorporates latest information covering overhead materials handling equipment. Subject material takes in various track drives, cranes, electrification, buckets, grabs, etc.
FOR MORE DATA CIRCLE NO. 52 ON REPLY CARD

Industrial Trucks

Baker-Raulang Co.—The anatomy of electric fork trucks is closely examined in a four-color, illustrated book offered. Series of 20 pictures of most important components of fork trucks is accompanied by explanatory copy. The book is intended as a reference for those concerned with the operation and maintenance of industrial fork lift trucks.
FOR MORE DATA CIRCLE NO. 53 ON REPLY CARD

EDITORIAL REPRINTS:

World-Widening Research

Battelle Memorial Institute hopes to extend research boundaries by enlisting aid from European sources. Plan has worked in two instances between American and German staffs. What has been done and plans for future growth are found on p. 40.
FOR MORE DATA CIRCLE NO. 54 ON REPLY CARD

Carburizing

Today carburizing is more than just a way of putting carbon into the surface of steel, says Dr. Allen Gray, Technical Editor, on page 62. Now physical properties that are uniquely suited to the engineering application of a part may be obtained.
FOR MORE DATA CIRCLE NO. 55 ON REPLY CARD

Working Stainless

Part II of the Precipitation Hardening series is on page 66. This article deals with 17-4 PH grade which combines high strength and corrosion resistance. Hardening done by single, low-temperature heat treatment eliminates scaling and distortion problems.
FOR MORE DATA CIRCLE NO. 56 ON REPLY CARD

Weed Killing

Chemical treatment has saved money and labor for many companies. Also, chemicals have fairly permanent killing effect on the weeds. Qualities of chemicals used and case histories are contained in the article beginning on page 70.
FOR MORE DATA CIRCLE NO. 57 ON REPLY CARD

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3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

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STEEL

July 5, 1954

Market Outlook

STEEL PRICES are going up. They'll be raised to pass along the additional costs of the new contract between steel producers and the steelworkers.

Prices will be increased even though steel is in a competitive market. Steel executives have been speaking out about the low earnings rate in their industry. Ernest T. Weir, chairman, National Steel Corp., says, for instance, they are not great enough to maintain investor confidence, and this confidence is necessary, he declares, in view of the need of $1 billion a year for the next 30 years just to replace present plant and facilities. The National City Bank of New York reports that in 1953 the iron and steel industry's net profit was 11.6 per cent of net worth, compared with an average of 12.5 per cent for all industries.

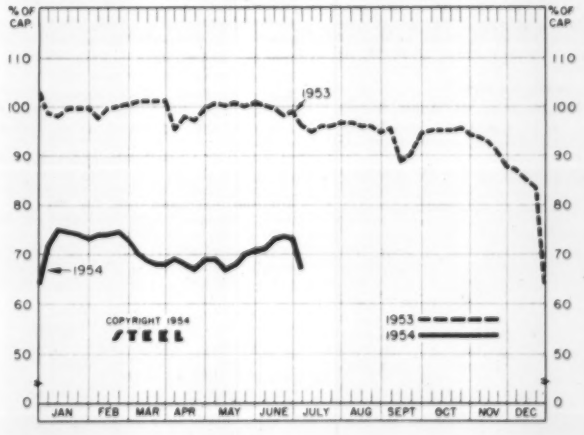
TWO INCENTIVES— The low rate of steel industry earnings is not the only incentive to pass along the costs of a wage hike. If the industry absorbed the hike, the union would conclude that the industry could afford even further and bigger settlements. The increased costs from the current settlement will be passed along even though steel demand is lower than it has been for several years. All steel producers will have to make about the same price increases; their competitive positions with one another will remain about the same as they are today. The steel industry's competitive position with other metals, too, will remain largely unchanged for the inflationary effect of the steel wage settlement will spread ultimately to other industries.

THE COST— Each cent of increase in wages and other benefits raises the cost of steel production 40 cents a ton. The settlement will cost some producers about 10 cents an hour per employee while for other producers the cost will be around 12 cents. That means the additional cost of producing steel is $4 to $4.80 a ton.

CONTRASTS— Meanwhile, deflationary effects of the reduced demand for steel are showing up in scattered decreases in prices. On the eastern coast leading steel warehouses made substantial decreases on a wide range of steel products. When steel demand dropped off late last year, warehouses were caught with large inventories of steel. In numerous cases, warehouses are having to convert inventories into cash to meet repayment dates on bank loans. Warehouse business has been hurt from two directions. Mills are competing actively for business that customarily goes to warehouses. And original equipment manufacturers have taken over more of their component production, farming out less to subcontractors. In many cases these subcontractors were customers of steel warehouses.

OUTPUT DROPS— Although a general steel strike was averted by amicable conclusion of negotiations, some scattered walkouts marred an otherwise peaceful bargaining period. These wildcat strikes along with the Independence Day holiday and vacations lowered the steel ingot production rate in the week ended July 4 to 67 per cent of capacity. This is a 6-point decline from the preceding week. A rate of 67 per cent would yield slightly less than 1.6 million net tons, smallest weekly output this year.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended July 4	Change	Same Week 1953	Same Week 1952
Pittsburgh	68	— 4.5*	92.5	5
Chicago	79	— 3.5*	102	7
Mid-Atlantic	57	0	96.5	17
Youngstown	72	0	93	0
Wheeling	88.5	+ 1.5	99	50
Cleveland	60	— 9*	97.5	0
Buffalo	67.5	0	106.5	0
Birmingham	76	0	99.5	0.5
New England	50	0	83	20
Cincinnati	64	— 5	99	32
St. Louis	65.5	— 8	107.5	31
Detroit	24	— 27.5*	105	49
Western	86	+ 1	107	33
National Rate	67	— 6	96	12.5

INGOT PRODUCTION‡

	Week Ended July 4	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	99.4†	107.1	104.2	128.8
NET TONS	1,597†	1,720	1,674	2,069

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 21 Technical Outlook—p. 61

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended June 29

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.575	Strip, C.R., stainless, 430 (lb)	$0.415
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.963
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454
Axles, railway	7.250	Bars, reinforcing	4.900	Pipe, galv., buttweld (100 ft)	17.731
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.974	Pipe line (100 ft)	141.960
Plates, carbon	4.550	Bars, C.F., alloy	10.975	Casing, oil well, carbon (100 ft)	149.516
Structural Shapes	4.367	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.755	Tubes, boiler (100 ft)	‡
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.696	Tubing, mechanical, carbon	‡
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.965	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548	Tin plate, hot-dipped, 1.25 lb	$8.433
		Sheets, electrical	9.000	Tin plate, electrolytic, 0.25 lb	7.133
		Strip, C.R., carbon	7.229	Black plate, can making quality	6.233
				Wire, drawn, carbon	7.713
				Wire, drawn, stainless, 430 (lb)	0.545
				Bale ties (bundle)	5.653
				Nails, wire, 8d common	7.488
				Wire, barbed (80-rod spool)	6.852
				Woven wire fence (20-rod roll)	16.174

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	June 29 1954	June 22 1954	Month Ago	June Average
(1947-1949=100)	140.9	140.9	140.9	140.9

STEEL's FINISHED STEEL PRICE INDEX*

	June 30 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.75	189.75	189.75	189.18	152.90
Index in cents per lb	5.140	5.140	5.140	5.125	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	June 30 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	$113.20	$113.20	$113.70	$114.84	$91.82
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.07
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	27.83	27.83	28.50	40.50	19.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	June 30 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	4.15	3.35
Bars, H.R., Chicago	4.15	4.15	4.15	4.15	3.35
Bars, H.R., del. Philadelphia	4.405	4.405	4.405	5.302	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	5.20	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	4.10	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	4.10	3.25
Shapes, del., Philadelphia	4.38	4.38	4.38	4.38	3.492
Plates, Pittsburgh	4.10	4.10	4.10	4.10	3.40
Plates, Chicago	4.10	4.10	4.10	4.10	3.40
Plates, Coatsville, Pa.	4.10	4.10	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.10	4.10	4.10	4.10	3.40
Plates, Claymont, Del.	4.10	4.10	4.10	4.55	3.50
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.925	3.25
Sheets, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.975	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.275	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.425	3.25
Strip, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.45-5.95	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.70	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.45-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75

SEMIFINISHED STEEL

Billets, forging, Pitts (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton

	June 30 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.89
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$29.50	$29.50	$30.50	$44.50	$21.00
No. 1 Heavy Melt, E. Pa.	23.00	23.00	23.00	43.50	18.00
No. 1 Heavy Melt, Chicago	31.00	31.00	32.00	41.50	19.50
No. 1 Heavy Melt, Valley	27.50	28.50	29.50	45.50	18.50
No. 1 Heavy Melt, Cleve.	26.50	27.50	28.50	43.50	15.00
Rails, Rerolling, Chicago	42.50	44.50	44.00	50.00	27.75
No. 1 Cast, Chicago	36.00	38.50	38.50	40.00	27.50

COKE, Net Ton

Beehive, Furn, Connisvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	17.00	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.00-27.50 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Etmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis; N.Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N.J.

Mercury: Open market, spot, New York, $270-$275, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price June 30	Last Change	Previous Price	May Avg.	Apr. Avg.	June 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	29.955	29.875
Lead	13.80	June 15	14.05	13.800	13.710	13.213
Zinc	11.00	June 3	10.50	10.290	10.250	11.000
Tin	96.625	June 30	96.50	93.600	96.260	92.918
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 96.625.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max.) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.00, brass special 11.25, intermediate 11.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.35, special high grade 12.50, die casting alloy ingot 15.00, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingots: Piston Alloy 20.00-20.50; No. 12 foundry alloy (No. 2 grade) 19.25-19.75; 5% silicon alloy, 0.60 Cu max., 22.25-22.50; 13 alloy, 0.60 Cu max., 22.25-22.50; 195 alloy 21.00-21.50; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.00-20.50; grade 2, 19.00-19.50; grade 3, 18.00-18.50; grade 4, 17.00-17.50.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R. ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ...	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks		60.0	...

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
⅜	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.00; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.00-11.25; battery plate 5.75-6.00; linotype and stereotype 13.00; electrotype 11.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 14.75-15.25; 51S, 52S clippings 14.75-15.25; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 13.00-13.50; old sheet 12.00-12.50; old cast 12.00-12.50; clean old cable, free of steel 14.50-15.00; borings and turnings 12.50-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier not less than 1.5% Be, 42.00; light scrap 37.00.

Copper Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.75-23.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.50; yellow brass turnings 16.00; radiators 17.50-17.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,0000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 57.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 100-1900 lb $1.037; 2000-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.

Stannous Sulphate: Less than 5 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.82	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5% ...	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

Production of nonferrous extrusions contributes to an increasing use of major metals. It takes steel, for instance, to make the presses that make extrusions

EXTRUDED SHAPES of nonferrous metals and alloys contribute to an increasing use of major metals.

Closely paralleling increased use of nonferrous extrusions are improved presses, diemaking and development of alloys, the latter an outgrowth in progressive use of extruded shapes for a larger number of applications.

With advent of heavier presses and high-pressure closed extruding dies, trend in forming shapes is toward forcing metal to the desired shape. Scrap losses are greatly reduced by the extrusion process, and machining is reduced.

Aluminum Leads—Of the nonferrous metals, aluminum is well in the lead tonnagewise, and volume is going up steadily as alloys are created for improved extrusion process. Shipments of aluminum extrusions and tubing this year will probably slightly exceed the 446 million pounds of 1953; in 1952 shipments totaled 347 million pounds; in 1951 volume was 311 million pounds.

Not more than 15 per cent of currently extruded aluminum shapes is going into military applications, mostly aircraft. However, giant extrusion presses under construction for the Air Force program will give impetus to the general aluminum extrusion process and broaden commercial demand. One 14,000-ton extrusion press producing large intricate shapes for aircraft at Aluminum Co. of America, Lafayette, Ind., has already pointed the way to possible increase for commercial applications with improved practice at more economical costs.

Frame for Business—Increase in the use of extruded aluminum shapes in some industries has been phenomenal; one is in production of window frames, the bulk now being aluminum. Display windows and store fronts require close to 100 million pounds this year, mostly extrusions; this process of forming shapes combines structure and surface finish in one section and materially reduces joining problems.

Another large market is portable irrigation tubing. Leading users of extruded shapes are the building industry, railroads, automotive and electrical. Growth is also tremendous in the furniture industry. Trend is toward heavier presses as demand develops for larger shapes. Tolerances are constantly improving with uniformity. Extruded shapes as a tonnage factor are generally a postwar development.

Improvements Pay—Recent vast improvements in extrusion techniques undoubtedly account for very definite increased usage of extruded copper and copper-base alloy shapes.

STEEL's Metal Price Averages for June, 1954

(Cents per pound)

Electrolytic Copper, del. Conn.	30.000
Lead, St. Louis	13.906
Prime Western Zinc, E. St. Louis	10.923
Straits Tin, New York	94.178
Primary Aluminum Ingots, del.	21.500
Magnesium, Freeport, Tex.	27.00
Nickel, f.o.b. refinery	60.000

Copper and many of its alloys are commonly extruded in the production of mill products such as tube, rod, wire and shapes. For these purposes extrusion offers high-quality surfaces and the ability to produce intricate shapes.

Advances—Recent developments in extrusion equipment and techniques have made possible the production of larger and more complicated shapes. Among these shapes are found hollow cross-sections with irregular exteriors, a form of shape not available until comparatively recently. The present trend is toward an increasing variety of complex shapes and larger sizes. Cross-sections up to 7.5 inches maximum dimension can be furnished by at least one mill.

Particularly for complicated shapes, the alloys most commonly used are architectural bronze and free-cutting brass with the emphasis on the low-copper alloys. Products produced by extrusion cover a wide range.

Significant among these are shapes for the manufacture of electrical switchgear, connectors and pole line hardware, machinery components, valve components and watch cases.

Extruded copper alloy shapes, including free-cutting brass, are utilized increasingly where product design requires substantial machining along longitudinal axis, flutings, curves and recesses. Less machining and scrap with higher output and lower production costs frequently result.

Stimulant—Need of larger sections for aircraft assembly and added tensile strength with minimum of rivets and fasteners has stimulated design for magnesium alloy extrusions to much the same degree as in aluminum. But this is leading to increasing use of magnesium for commercial applications. Dow Chemical Co., Madison, Ill., will soon have in operation a 13,200-ton magnesium extruding press partially built in Germany during World War II; Dow engineers improved the design for production of large extruded structural sections. This press will also produce stock for forging and other magnesium extrusion operations. Dow's Madison plant has in addition six extrusion presses; one is 5500-ton capacity, two 3000-ton capacity each, two 1700-ton and one rating 250 tons.

Nonferrous extrusion press installations also include equipment for working titanium. The process for shaping this metal is especially important due to minimum scrap losses.

Copper Capers Are Strong

Supply of refined copper for July shipment tightened considerably as large producers began late last week to report full order books for big orders.

The tightness applies to Chilean copper as well as domestic metal.

May consumption of refined copper by fabricators was 102,810 tons, says the Copper Institute. That's only 2000 tons less than the 104,693 tons consumed in April. The 102,810 tons was approximately 8200 tons less than the amount delivered to fabricators by the primary producers. So fabricators' stocks increased over the month of May to 349,796 tons.

At the same time copper supply was beginning to squeak last week, lead and zinc demand dragged along in the doldrums. Tin demand perked up, however, with the acceptance of the Tin Agreement by Australia and Turkey. Tin prices advanced in a week 2.000c to 96.625c per pound, Straits metals, delivered in New York.

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for urgent military and

civilian requirements

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Columbus, O. Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 103. Key to footnotes, page 105.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..80.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston 85 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2..75.50
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14..75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston 85 .....90.00
Ind.Harbor,Ind. Y1 ....82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14..82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 .....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ...$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 .....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 .....4.525
Fontana,Calif. K1 ....5.325
Houston 85 .....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. 85 ....4.865
Kokomo,Ind. C16 ....4.625
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 .....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ..4.825

STRUCTURALS

Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gadsden,Ala.(31) R2 ...4.13
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston 85 .....4.50
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. 85 ....4.70
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa, Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.80
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.10

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....3.80
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L. A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5,W14,.6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L. A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

PILING

Bearing Piles
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel
Aliquippa,Pa. J5 .....4.10
Ashland,Ky.(15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Buffalo(31) R2 .....4.13
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.10
Chicago(31) R2 .....4.17
Cleveland J5 .....4.10
Cleveland(31) R2 .....4.16
Coatesville,Pa. L7 ....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.25
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gadsden,Ala.(31) R2 ...4.13
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....3.85
Houston 85 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
LoneStar,Tex. L6 .....4.40
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14.4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O.(31) R2 .....4.14
Weirton,W.Va. W6 ....4.10
Youngstown U5, Y1 ....4.10
Youngstown(31) R2 ....4.15

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 ....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.40
Fairfield,Ala. T2 .....6.25
Fontana,Calif(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ...6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ...6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 ....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 ....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland l.c.l. (15) A10..4.85
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.35
Bessemer,Ala. T2 .....4.15
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Canton,O.(31) R2 .....4.31
Chicago(31) R2 .....4.22
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.30
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ...4.18
Houston 85 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. 85 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Massillon,O. R2 .....4.15
Minnequa, Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14, P23 ..4.90
So.Chicago U5, W14 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill. (1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.025
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston 85 .....5.275
Ind.Harbor,Ind. I-2,Y1.4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. 85 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2,U5,W14.4.875
So.Duquesne,Pa. U5 ...4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 .....4.30

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....5.00
Houston 85 .....5.60
KansasCity 85 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12 ...5.20
BeaverFalls,Pa. R2 ....5.26
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ...5.20
Gary,Ind. R2 .....5.27
GreenBay, Wis. F7 ....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 ....5.70
Harvey,Ill. B5 .....5.20
LosAngeles R2 ....6.65-6.96
LosAngeles S30 .....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R8 .....5.20
Massillon,O. R2 .....5.24
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa.(17) B4 ..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 .....5.20

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 ....6.325
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2,M13.6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ...6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2,W14.6.325
SpringCity,Pa. K3 ....6.50
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 .....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ..6.325

BARS, Reinforcing (fabricators)
Atlanta A11 .....4.35
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Chicago(31) R2 .....4.22
Cleveland(31) R2 .....4.21
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gadsden,Ala.(31) R2 ...4.18
Gary,Ind. U5 .....4.15
Houston 85 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. 85 ....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa, Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.00
Seattle B3, N14, P23....4.90
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill.(1) N15 ....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

BARS, Reinforcing (Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.55
KansasCity 85 .....6.35
LosAngeles B3 .....5.80
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3, P23 .....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt, ⅛-1" B2 ..5.55
Williamsport,Pa. S19 ...5.45

RAIL STEEL BARS
Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.05
ChicagoHts.(4) C2, I-2..4.15
Ft.Worth,Tex.(26) T4 ..4.65
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.15
Tonawanda(3,4) B12 ...4.15
Williamsport,Pa.(3) S19.4.25
Williamsport,Pa.(4) S19.5.45

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(S.R.) L5 ...10.40
McK.Rks.(D.R.) L5 ...14.00
McK.Rks.(Staybolt) L5..16.50

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.925
Allenport,Pa. P7 .....3.925
Ashland,Ky.(8) A10 ...3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..3.975
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....3.975
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.125
Ind.Harbor,Ind. I-2, Y1.3.925
Irvin,Pa. U5 .....3.925

Kokomo,Ind. C16 .....4.025
Lackawanna,N.Y. B2 ..3.925
Munhall,Pa. U5 .....3.925
Newport,Ky. N9 .....3.925
Niles,O. N12 .....5.175
Pittsburg,Calif. C11 ...4.625
Pittsburgh J5 .....3.925
Portsmouth,O. P12 ....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ..3.925
SparrowsPoint,Md. B2.3.925
Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ...4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ...3.925

SHEETS H.R. (19 ga. lighter)
AlabamaCity,Ala. R2 ..5.225
Dover,O. R1 .....5.05
Kokomo,Ind. C16 ....5.025
Mansfield,O. E6 .....5.05
Niles,O. N12 .....4.775
Torrance,Calif. C11 ..5.875

SHEETS, H.R. (18 ga. heavier) High-Strength Low-Alloy
Cleveland J5, R2 .....5.90
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.05
Fairfield,Ala T2 .....5.90
Fairless,Pa. U5 .....5.95
Fontana,Calif. K1 ....6.675
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ..5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 .....5.90
SparrowsPoint(36) B2 ..5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....5.90
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)
Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)
Allenport,Pa. P7 .....4.775
Cleveland J5, R2 ....4.775
Ecorse,Mich. G5 .....4.925
Fairfield,Ala T2 .....4.775
Fairless,Pa. U5 .....4.825
Follansbee,W.Va. F4 ..4.775
Fontana,Calif. K1 ....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....4.975
Ind.Harbor,Ind. I-2, Y1.4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ...5.725
Pittsburgh J5 .....4.775
Portsmouth,O. P12 ....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ...4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.375
Fairless,Pa. U5 .....7.275
Fontana,Calif. K1 ....8.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1.7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ..7.225
Pittsburgh J5 .....7.225
SparrowsPoint(38) B2.7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.075	6.675
Fairfield T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind.Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.175	....
MartinsFry.,O. W10	6.075	....
Pitts.,Calif. C11	6.825	....
SparrowsPt. B2	6.075	....
Torrance,Cal. C11	7.075	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.575
Fairfield,Ala. T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Galvanized Hot-dipped
AlabamaCity,Ala. R2 5.275‡
Ashland,Kty. A10 ....5.275*
Butler,Pa. A10 .....5.275†
Canton,O. R2 .....5.275‡
Delphos,O. N16 .....5.775‡
Dover,O. R1 .....5.275‡
Fairfield,Ala. T2 ....5.275*
Gary,Ind. U5 .....5.275*
GraniteCity,Ill. G4 ..5.475‡
Ind.Harbor,Ind. I-2 ..5.275†
Irvin,Pa. U5 .....5.275†
Kokomo,Ind. C16 ....5.375‡
MartinsFerry,O. W10 .5.275*
Middletown,O. A10 ..5.275†
Niles,O. N12 .....5.275‡
Pittsburg,Calif. C11...6.025*
SparrowsPt.,Md. B2 ..5.275*
Steubenville,O. W10 ..5.275‡
Weirton,W.Va. W6 ...5.275*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous

SHEETS, Galvanized High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron
Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825
Kokomo,Ind. C16 .....5.925
Niles,O. N12 .....5.825

SHEETS, GALVANIZED Ingot Iron (Hot-dipped continuous)
Ashland,Ky. A10 .....5.525
Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, Aluminum Coated
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ...7.20
Follansbee(23) F4 ....6.425
Yorkville,O. W10 .....7.20

SHEETS, Long Terne Steel (Commercial Quality)
BeechBott'm,W.Va. W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Well Casing
Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 .....3.925
Birmingham C15 .....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5 .4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 ...4.15
N.Tonawanda,N.Y. B11 3.925
Pittsburg,Calif. C11 ..4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill., A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3, P23 ...4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2..3.925
Torrance,Calif. C11 ....4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 .....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ...5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3, P23 ....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 .....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind. G5 .....5.45
Baltimore T6 .....5.60
Bridgeport,Conn.(10)S15 5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....5.60
Detroit D2, M1 .....5.60
Detroit P20 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.60
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Indianapolis C8 .....5.60
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 .....5.45
NewBedford,Mass. R10..6.00
NewBritain(10) S15 ....5.45
NewCastle,Pa. B4, E5 ..5.45
NewHaven,Conn. A7 ....6.20
NewHaven,Conn. D2 ...5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(32) R6 .....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 .....5.45
Warren,O. B9, R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. A7 ....6.30
Youngstown C8, Y1 ....5.45

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.30
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2 ..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 .....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G2 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman & Scott
N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Cleveland,O. C7	...	8.00	8.60	10.55	12.85
Dearborn,Mich. D3	5.60	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Indianapolis C8	...	7.80	8.60	10.55	....
Mattapan,Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	....
Buffalo W12	...	...	12.50	....	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge,Pa. A4	...	...	8.75	9.75	10.65
IndianaHarbor,Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield,O. E6	7.85	8.15	8.75	9.75	10.65
Newport,Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles,O. N12	7.85	8.15	8.75	9.75	....
Vandergrift,Pa. U5	...	8.15	8.75	9.75	10.65
Warren,O. R2	7.85	8.15	8.75	9.75	....
Zanesville,O. A10	...	8.15	8.75	9.75	10.65

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity,Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05†	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American 1.25 Coke (Base Box)	lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated))	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill.(1) N15	5.625
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving(8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Portsmouth,O. D2	9.50
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)	
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(48)K4 6.775 7.325	
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ....
Crawfordsville,Ind. M8	6.775 7.30
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	6.775 7.475
Jacksonville,Fla. M8	7.20 7.73
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ....
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts.,Calif. C11	7.625 8.025†
Portsmouth,O. P12	6.675 ....
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48)	C10 7.625 8.025**
Spar'wsPt.B2(48)	6.775 7.325*
Sterl'g(1) (48)	N15 6.675 7.225
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City, 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga.J5	143*
Atlanta A11	145
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga., 6" B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

WIRE, Barbed	Col.
AlabamaCity R2	153**
Aliquippa J5	150*
Atlanta A11	158
Bartonville,Ill. K4	158
Crawfordsville,Ind. M8	158
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156*
Joliet,Ill. A7	153†
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155†
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	176**
SparrowsPoint,Md. B2	158*
Sterling,Ill. (1) N15	156

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Galv. Stone	Galv. Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville K4	12.60	14.40
Buffalo W12	12.50	....
Cleveland A7	12.50	....
CrawfordsvilleM8	12.50	14.30
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	12.75	14.45**
Palmer,Mas.W12	12.50	14.05†
Pitts.,Calif. C11	12.85	14.40†
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	12.50	14.35
Waukegan A7	12.50	14.05†
Worcester A7	12.80	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	133
Bartonville,Ill. K4	133
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	133
Aliquippa,Pa. J5	133
Atlanta A11	135
Bartonville,Ill. K4	135
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Rankin,Pa. A7	133
So.Chicago,Ill. R2	133
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2 I-2	145
Duluth,Minn. A7 (49)	145
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	150
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	148

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	....	...	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W.Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F61‡	26.5	list	19.5	+4	12.5	+9	....	..	....	..	....	....	....	....	....	....
Etna, Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fairless, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
Fontana, Calif. K1 (§)	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	list	19.50	+4.00	12.5	+9	....	..	....	..	....	....	....	....	....	....
Sharon, Pa. M6	...	...	....	...	....	....	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20	34.75	21
Youngstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5(‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
Benwood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fairless, Pa. N3	33.25	....	34.75	....	34.75	...	25.75	....	25.75	....
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	21.5	36.75	21	36.75	21	27.75	11.5	27.75	11.5
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.02	18.44
1¼	13	....	22.53	18.12
1½	13	20.65	24.91	20.01
1¾	13	24.40	29.43	23.66
2	13	27.34	32.98	26.51
2¼	13	30.80	37.15	29.86
2¼	12	33.43	40.32	32.41
2½	12	36.82	44.41	35.70
2¾	12	39.87	48.09	38.66
3	12	42.52	51.28	41.23

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	Std. Toe Rails All No. 2	Std. Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	...
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	...
Johnstown,Pa. B2	....	....	...(16)	5.20
Lackawann,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.225	....	5.70
Steelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES

Fairfield,Ala. T2 .....5.125
Gary,Ind. U5 .....5.125
Ind.Harbor,Ind. I-2 ...5.125
Lackawanna,N.Y. B2..5.125
Minnequa,Colo. C10 ...5.125
Pittsburg,Calif. C11 ...5.275
Seattle B3 .....5.275
Steelton,Pa. B2 .....5.125
Torrance,Calif. C11 ...5.275

TRACK BOLTS (20) Treated

Cleveland R2 .....11.00
KansasCity,Mo. S5 ....11.00
Lebanon,Pa. B2 .....11.00
Minnequa,Colo. C10 ...11.00
Pittsburgh C3, P14 ...11.00
Seattle,Wash. B3 .....11.50

JOINT BARS

Bessemer,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Ind.Harbor,Ind. I-2 ...5.275
Joliet,Ill. U5 .....5.275
Lackawanna,N.Y. B2 ..5.275
Minnequa,Colo. C10 ...5.275
Steelton,Pa. B2 .....5.275

AXLES

Ind.Harbor,Ind. S13 ....6.50
Johnstown,Pa. B2 .....6.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....7.05
Ind.Harbor,Ind. I-2, Y1.7.05
KansasCity,Mo. S5 .....7.30
Lebanon,Pa. B2 .....7.05
Minnequa,Colo. C10 ....7.05
Pittsburgh J5 .....7.05
Seattle B3 .....7.55
So.Chicago,Ill. R2 .....7.05
Struthers,O. Y1 .....7.05
Youngstown R2 .....7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 6.90c
⅞-in. under .....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 5
¾-in. and larger 3
Longer than 6 in.:
All diameters ..... +4
Lag bolts, all diams.:
6 in. and shorter..... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts ..... List
Boiler & Fitting-Up Bolts 23

NUTS

H.P. and C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
¾" and smaller 58
⅞" to 1⅛", inclusive. 60
1¼" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex regular & heavy:
All sizes 58
Hot Galv. Nuts (all types):
¾" to 1½", inclusive. 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in, and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 34
¼ in. diam & larger.... 14
N.F. thread, all diams. 8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish .....47.5 x 10
Plated finishes .....30 x 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
⅝-in. & smaller 38
⅞-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller ... 20
⅞-in. through 1 in. .. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge Iron: Cents
98+% Fe, annealed. 18.00
Unannealed
Minus 100 mesh .. 14.50
Minus 35 mesh .. 10.25
Minus 20 mesh .. 10.00
Swedish, c.i.f. N. Y., c.l., in bags 11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags ... 11.25
Electrolytic Iron:
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in. 22.00
Annealed, 99.5% Fe. 36.50
Unannealed (99+% Fe) 32.50
Unannealed (99+% Fe) (minus 325 mesh) 52.00
Powder Flakes (minus 16, plus 100 mesh).. 31.00
Carbonyl Iron:
97.9-99.8% size 5 to 10 microns..83.00-148.00
Aluminum:
Atomized, 500 lb drums, frgt. allowed:
Carlots 32.00
Ton lots 34.00
Antimony, 500 lb lots 32.00*
Brass, ¼-ton lots .....28.75-37.50†
Bronze, ¼-ton lots .....31.00-39.00†
Copper:
Electrolytic 13.50*
Reduced 13.50*
Lead 7.50*
Manganese:
Minus 35 mesh 61.00
Minus 100 mesh 67.00
Minus 200 mesh 72.00
Nickel, unannealed 89.50
Nickel-Silver, ¼-ton lots .....45.75‖
Nickel-Silver, ¼-ton lots 48.50**
Phosphor-Bronze, ¼-ton lots 58.50
Silicon 43.50
Solder 8.50*
Stainless Steel, 302 .... 91.00
Tin 14.50*
Zinc, ¼-ton lots.18.25-32.00‡
Tungsten Dollars
Melting grade, 99% 60 to 200 mesh:
1000 lb and over.... 4.95
Less than 1000 lb .. 5.10
Chromium electrolytic 99.2% Cr min. 3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. ‖70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold Rolled 10%	Cold Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.875
18.25	4.25	1	4.75	...	2.160-2.320
18	4	2	9	...	2.515
18	4	2	....	...	1.640
18	4	1	....	...	1.480
13.5	4	3	....	...	1.735
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	...	0.495
1.5	4	1	....	8.5	0.865-0.895

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	*60.50*	*61.00*	*61.50*	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockewood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00

ERIE

All Parts in Erie Hammers Subject to Impact are **STEEL**

ERIE FOUNDRY COMPANY, ERIE, PA.

ERIE BUILDS *Dependable* **HAMMERS**

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Erie, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.12	7.78	....	7.00	...	6.86	8.17[4]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	....	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	44.78[9]	7.13	...	6.87	8.35	12.13	7.06	7.13	8.26
Buffalo	6.11	7.10	8.65	....	6.50	...	6.27	7.65	11.97	6.49	6.45	7.80
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	7.95	43.55	6.42	...	6.28	7.30	11.60	6.46	6.33	7.46
Cincinnati	6.30	7.11	8.00	50.80	6.66	...	6.52	7.60	11.85	6.93	6.62	7.71
Cleveland	6.18	7.12	8.25	45.66	6.58	...	6.34	7.40	11.74	6.79	6.50	7.63
Detroit	6.38	7.29	8.22	....	6.69	7.36	6.56	7.60	11.97	6.91	6.80	7.80
Erie, Pa.	6.15	...	8.25	....	6.45	...	6.28	7.25[4]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	....	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	9.00	8.85	50.15	7.55	11.20	7.15	9.10	12.90	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.12	....	6.59	...	6.45	7.57	11.77	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.30	....	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.78	7.52	8.37	44.15	7.16	...	7.06	8.43[4]	11.99	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	....	7.00	...	7.00	8.50	....	7.00	7.00	7.85
Philadelphia	6.00‡‡	7.13	7.87	41.98[9]	6.40‡‡	8.80	6.52‡‡	8.19[4]	11.74	6.42‡‡	6.30‡‡	7.34‡‡
Pittsburgh	6.18	7.12	8.00	50.50	6.55	...	6.28	7.65	11.60	6.46	6.33	7.46**
Portland, Oreg.	7.60	8.45	9.05	....	7.65	...	7.35	10.65	....	7.25	7.25	9.15
Richmond, Va.	6.50	...	8.67	....	7.10	...	7.05	8.20	....	7.10	6.85	8.20
St. Louis	6.48	7.42	8.25	43.89	6.72	...	6.58	7.70	11.90	6.86	6.73	7.86
St. Paul	6.84	7.78	8.61	....	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	8.95	50.15	7.60	...	7.15	9.75	12.90	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	50.50	8.00	...	7.60	10.65	13.35	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	....	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	....	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed. ‡‡City delivery charge is 10 cents. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [6]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Philadelphia Distributors Revise Prices

Reductions of several dollars a ton are posted on base prices and city delivery charges for rolled products. Move is attempt to stabilize market

Philadelphia—Leading warehouses in this area are reducing prices several dollars a ton on most hot-rolled products. On base quantities of 2000 to 9999 pounds, f.o.b. warehouse, they are now quoting hot-rolled sheets at 6.00c per pound, hot-rolled strip, 6.40c, hot-rolled bars, 6.52c, structurals, 6.42c, carbon plates, 6.30c, and floor plates, 7.34c on the heavier gages and 7.72c on 12-gage and lighter.

On a metropolitan delivered basis, prices are 10 cents per 100 pounds higher, indicating a change, as they affect certain items, in the differential which has been 25 cents. Cold-rolled products and coated items are unchanged.

The new schedules are designed to bring stability to the market. July business is expected to be off seasonally from that in June, which, in turn, was off slightly from that of the preceding month.

Cleveland—Pre-holiday lull is being felt by warehouses in this district, and with many manufacturing plants scheduled to be down for the first couple weeks of July for mass vacations, the distributors do not look for much change in market conditions over the next month. Warehouses generally are scheduling employee vacations in the traditional fashion since mass vacations are not practicable in a service industry such as steel distribution.

Warehouse inventories are in good shape. In fact, they are in such position the distributors have not shown any particular concern over the threat of a strike in the steel industry.

Bridgeport Brass Co. last week announced stocks of aluminum rod for immediate delivery in various sizes, shapes and analyses are now available for shipment from its Cleveland warehouse.

Pittsburgh—Warehouse customers

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.75	$4.70	$5.03
Bar Size Angles	4.50	4.50	4.40	4.73
Structural Angles	4.50	4.50	4.40	4.73
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.75	6.75	6.75	7.08
Merchant Bars	6.75	4.75	4.70	5.03
Hot-Rolled Bands	4.90	4.90	4.85	5.18
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

adopted a wait-and-see attitude as wage negotiations reached a deadline. Consequently sales became more sporadic at end of June. Total volume of shipments dropped slightly. Bars, sheet and most tubular products continue to move slowly.

New York—Steel warehouse volume is expected to drag during next two months. June sales approximated May volume with most products moving slowly in small lots. Not only are distributors confronted with slow demand, but they must meet sharp competition from foreign steel, combination small orders placed direct with mills for prompt shipment and price-shading. Light structurals, bars and bar shapes are soft, also carbon sheets. Alloys are relatively slower than carbon products.

Peter A. Frasse & Co., Inc., steel distributor since 1816, with warehouses at Lyndhurst, N. J., Philadelphia, Hartford, Conn., Buffalo and Syracuse, N. Y., is now handling aluminum products in addition to steel. Frasse will distribute Reynolds Metals Co. products. It will stock aluminum rods, bars, wire, sheets, plates, tubing and extruded shapes.

Boston — Foreign structurals and bars are cutting into warehouse volume. Sharp competition has eased domestic steel prices on several products, including carbon sheets and pipe at the warehouse level. Attractive orders for stainless also are subject to pressure.

Chicago — Buying of warehouse steel will dip some this month. Widespread closing of manufacturing plants for vacations will put a crimp in consumption.

Strike protective buying prior to announcement of a wage settlement June 29 wasn't much in evidence in the warehouse trade. The reason: It was known the warehouses were well stocked.

Cincinnati — Little buying as a strike hedge was noted here. Warehouse order volume varies from day to day. Prices on flat-rolled products have stiffened.

Los Angeles—Distributors report activity in the first half was down 15 to 20 per cent from the like period last year.

San Francisco—June volume just about equaled May sales. Buying is more or less on a hand-to-mouth basis, consumers placing orders about in line with their own production.

Seattle—Improvement is noted in the warehouse trade, one large interest reporting heavier buying, with June volume in excess of that last year.

Structural Bookings Increase in May

Order volume during month is heaviest since February. Shipments in first five months exceed those in like period of 1953. Backlogs down but top 1947-1950 average

Structural Shape Prices, Page 102

New York—Although recent structural awards in this area have been light, demand is accumulating with the probability of action on 6900 tons for a viaduct in Newark, N. J., being taken shortly. Bethlehem Steel Co. is low, with a bid of $2,335,972.50.

May bookings of fabricated structural steel throughout the country of 200,994 tons were the heaviest since last February, according to the American Institute of Steel Construction. Bookings for the first five months amounted to 1,023,839 tons, against 1,322,877 tons in the corresponding period of last year. They also compared with the 889,640 ton average for the same period in the years, 1947-1950, inclusive.

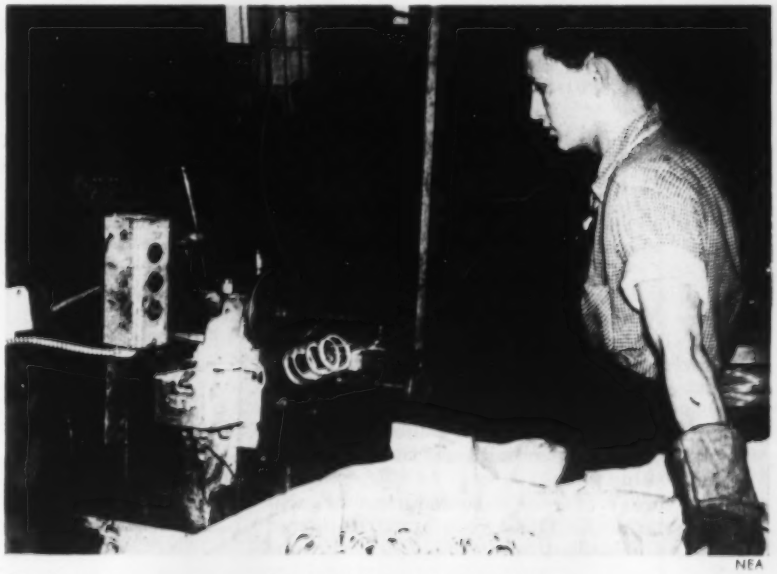
The May total compared with 266,594 tons in February, the top month for the year to date, and with a revised figure of 184,982 tons in April.

Shipments of 254,098 tons were down from the peak movement in April of 293,532 tons, as recently revised. However, they brought shipments for the first five months up to 1,331,743 tons, a gain over the corresponding period of last year, when the movement amounted to 1,285,883 tons. They also compared with 910,654 tons, the average first five-month total for the years 1947 to 1950, inclusive.

Backlogs as of May 31 of 1,489,662 tons were down from 2,178,918 tons on the same date last year, but were up from the 1,192,401 tons, representing the average for that date in the years 1947 to 1950, inclusive.

Percentage of backlog tonnage scheduled for production in the four months ending Sept. 30 is 61 per cent, compared with 47 per cent last year, and for the four months following 39 per cent, against 53 per cent.

Boston—Bridge inquiry is heavier, including estimates for the central artery, Boston, 2500 tons, part of the underground section. Due for estimates soon are 3100 tons, bridge over



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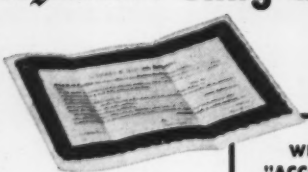

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the Chicopee river. Connecticut and Maine highway bridge work is showing more life, including a six-span girder, Norwich, Conn.

Larger fabricating shops are improving delivery to four-five months while district shops, maintaining backlogs at three months, are able to better this. Except on bar shapes out of Fairless, Pa., one leading producer is not now equalizing on standard structurals or wide-flange beams.

Cleveland—Building continues at a good pace in this area, public projects being outstanding in current work, though considerable volume of commercial construction is also reported.

Interest, currently, is directed to plans for construction of the Indiana state 156-mile turnpike. First construction is expected to be started on a 70-mile stretch between Elkhart and a junction with Ohio's turnpike.

Latest report is to the effect bids for initial construction may be taken this month. Some 59,000 tons of structurals, 27,000 tons of reinforcing steel, as well as considerable culvert and storm sewer steel will be required for the project.

Philadelphia—Most structural fabricating shops are in fairly comfortable position and hence are not competing quite so sharply for business as they were several weeks ago. Those able to handle bridgework are in better position than others. This type of construction continues the most active.

New Orleans—Competing with an alternate for pre-stressed concrete, the structural steel fabricating industry lost 50,000 tons, estimated needs for the Lake Ponchartrain bridge and approaches, Greater New Orleans expressway. Low bidder is Brown & Root, Houston, Tex., on prestressed design. Structural requirements are reduced to under 5000 tons for specials, shoes, bascule span machinery and miscellaneous structural parts. Better than 15,000 tons of concrete reinforcing steel will be used.

Seattle — Fabricators have sufficient business on books to maintain current operations to end of 1953. Public construction is active. The proposed city hall for Tacoma, Wash., will take about 600 tons of structurals. Washington Iron Works, Seattle, is fabricating two diesel-electric gantry cranes, 44-ft, 125-ft booms, 19,000 pounds capacity, for the State Department, for use in building the Hirakud dam in India. Contract totals $359,279.

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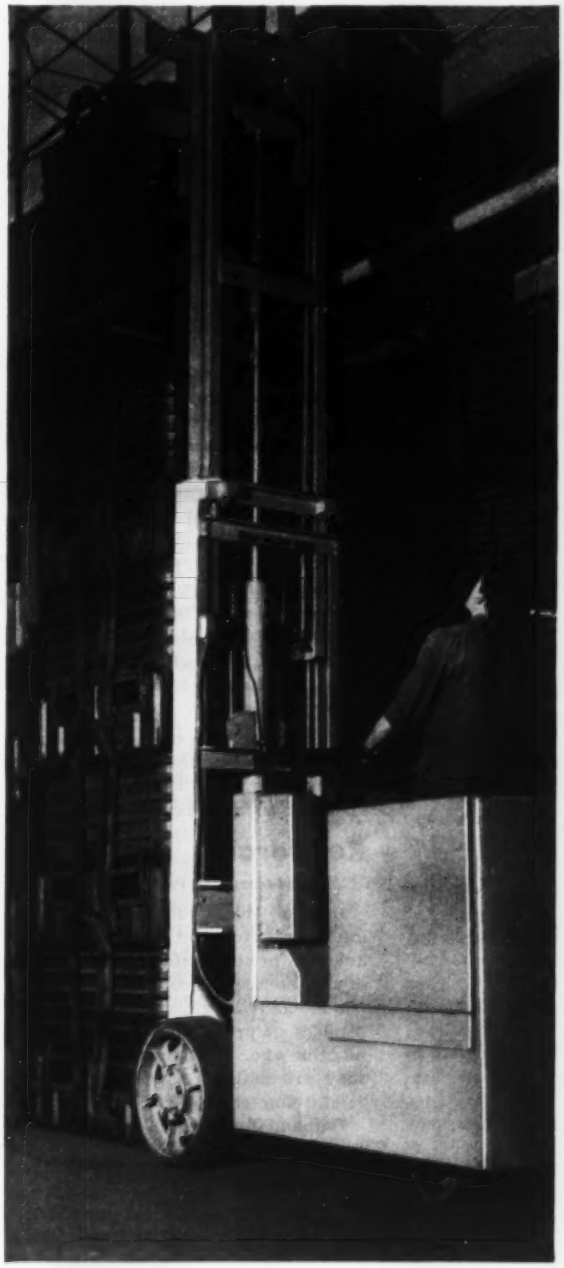

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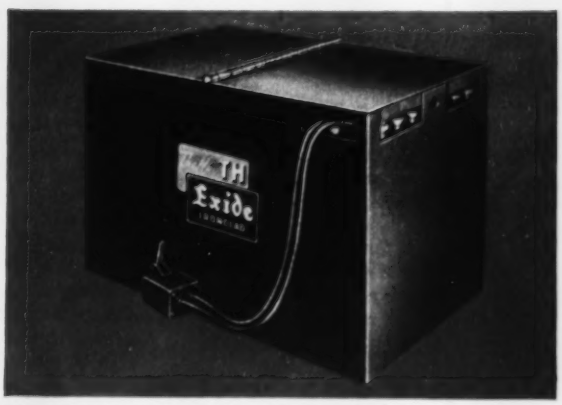

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Sheets, Strip . . .

Sheet and Strip Prices, Page 102 & 103

Cleveland—Sheet and strip business is holding up remarkably well for district producers despite the general seasonal slackening in demand attending the vacation season. Sellers have not booked heavily for July but, on the other hand, June volume exceeded their expectations as of the end of May, and the same may prove true for this month. Consumers are still working off inventories. As a result there has been relatively little strike-scare buying over recent weeks.

Galvanized sheets have been particularly active of late, not only on government grain bin account but for general building applications as well.

Hot and cold-rolled sheet volume is down noticeably from a year ago. However, in light of the expanded producing capacity over the past couple years the volume of business done in the first half of this year compares favorably with that in other recent years when capacity was substantially smaller.

Boston—Some business of a strike-hedge nature was placed with mills usually not affected by a general walkout just prior to the wage agreement between the steelworkers' union and the U. S. Steel Corp. announced June 29. This resulted in lengthening deliveries at certain mills.

In most cases, sheetmakers have openings in July schedules on carbon sheets and strip. Some mills, however, are booked into August on cold-rolled. Converters are reported to be holding substantial inventories of hot-rolled bands.

New York—Sheet business reflects little change, if any at all, on the up side compared with a month ago. This is particularly true in hot-rolled sheets and certain specialties, including electrical sheets and enameling stock.

Philadelphia — Sheet sellers were able to build up their order books a bit during June, particularly in hot-rolled sheets in some of the more popular sizes, such as 20 and 22 gages.

The steel strike threat caused some consumers to press the mills for deliveries by June 30 of tonnage due them and, in some cases, for tonnage scheduled for delivery later.

Pittsburgh — Cold-finished sheet producers received several sizable orders on the eve of labor contract deadlines June 30. Sales for July were expected to decline. Automakers' requirements will probably be lower in early third quarter. Gains are expected in September. Sales remain good in galvanized sheets. Silicon sheets and stainless sheets continue to move slowly.

Chicago—July sheet business will not total as much as June, but the volume is somewhat better than mills had expected. It is evenly distributed as to consuming groups. Galvanized sheets continue to show greatest strength.

Semifinished Steel . . .

Semifinished Prices, Page 102

Cleveland—Steelmaking operations were cut sharply here over the Fourth of July holiday. Republic Steel Corp. closed down its local open-hearths for four days beginning July 2. It operated only one blast furnace. At the same time the local works of Jones & Laughlin Steel Corp. closed down its open-hearth operations for 48-hours over the holiday.

Steel Bars . . .

Bar Prices, Page 102

Philadelphia — Hot-rolled carbon bar tonnage in June was sustained, if not actually a little heavier than in May. Inventory replacement, plus a little strike scare buying, had a little more to do with it than maintenance of, or improvement in consuming requirements.

Business in most consuming lines, such as railroads, forge shops, tool manufacturers and agricultural equipment builders appeared to be off, in the case of the latter seasonally. Activity in bolts and nuts along the eastern seaboard also was down.

Cold-drawn bar business continues fairly good.

Pittsburgh — Heavy competition dominates sales of cold-finished and hot-rolled bars, with shipments remaining level. Moderate decline is expected in alloy bar shipments during July, due to vacations and decreasing requirements of agricultural implement producers.

Boston—Basing points have been established on free-machining leaded steels by district converters. Buffalo and Hartford, Conn., will be named basing points on these grades shortly. Chemical, quality and lead extras are combined making the premium 75 cents, or slightly less per 100 pounds compared with standard machining screw stock. To meet this, a leading bar producer is rolling an extra high sulphurized, low carbon grade.

New York—Hot-rolled carbon steel bar demand is steady but it is on a restricted basis. Producers are able to quote nearby shipments on virtually all sizes and shapes. The new wage settlement may cause consumers to order more freely in an effort to beat a possible price increase.

Cleveland—Not much in the way of new bar business is anticipated over the next several weeks because of mass vacation shutdowns at many manufacturing plants served by district producers. As a general thing, consumers have been ordering on a monthly basis, and while volume in the first half was under that of last year it was substantially larger than had been indicated by week-to-week reports of sellers.

Some consumers still are living off inventories, but even those who are comfortably supplied find it necessary to order fill-in tonnage.

There has been some buying of a strike-scare nature in recent weeks, but it has not been noticeably heavy. Last week, however, a large midwestern consumer, reportedly advised by one mill to get tonnage on order books promptly if it wanted late summer delivery, purchased a substantial tonnage of surplus bars that were available from another producer for immediate shipment.

Chicago—Demand for bars in July is not far behind June bookings, but it came in slower. Part of the holding effect comes from farm equipment which retains most of its better output rate. Generally, there is improved demand for cold-finished bars.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 102

Boston—While concrete reinforcing bar prices to fabricators are holding, prices quoted by the latter are weakening in competition. Meanwhile, contractors are quoting bars in place at prices which prevailed six months ago. At current bargains they are making a good margin on reinforcing steel.

Demand for bridges is heavier. A Portland, Me., fabricator booked the bulk of the reinforcing bar tonnage required for the Portsmouth Air Base.

Seattle—Bethlehem Pacific Coast Steel Corp. has lighted a fourth furnace, increasing production to 80 per cent of capacity. Improved business is reflected. Rolling mills in the area have substantial backlogs. Reinforcing bar demands are large, the most important pending job involving 3250 tons for the fifth major unit of The Dalles dam, bids to U. S. Engineer, Portland, Oreg., about Aug. 31.

Tin Plate . . .

Tin Plate Prices, Page 104

Washington—Shipments of metal cans in April amounted to 323,923 tons, against a revised figure of 291,408 in March, and 304,638 in April 1953, reports the Bureau of Census. Total for the first four months this year was 1,140,072 tons, against 1,106,006 in the like 1953 period.

Food cans shipped in April amounted to 187,779 tons, against 174,879 in April 1953, and brought the total for the first four months up to 671,463 tons, against 656,985 in the same period of 1953.

Shipments of non-food cans amounted to 136,124 tons in April, compared with 129,759 in April 1953, bringing the total for the first four months to 468,609 tons, against 449,021 in the like period of 1953.

Plates . . .

Plate Prices, Page 102

Boston—The spread in delivered carbon plate prices ranges up to $13 per ton, freight and lowest eastern Pennsylvania base, $3.85, considered. Pittsburgh mills are not equalizing, and nearer producers are not meeting the Harrisburg, Pa., price.

Orders picked up in volume slightly late in June, with mill schedules flexible for prompt shipment. Consumers have small inventories but orders have been only to cover business on fabricators' books. Most shops could not go on more than four to six weeks.

New York—Plate business remains sluggish with deliveries easy, around two weeks and less. Settlement of steel wage negotiations with concessions to labor of 10 cents an hour on a package basis, has focused attention of buyers on the possibility of higher prices.

Philadelphia—Platemakers describe June business as possibly a shade more active than in May. Threat of a steel strike added a little tonnage but not much. Inventory replacement also may have been a trifle heavier. This is particularly true in the case of structural fabricating shops. However, with good mill delivery promises, the general tendency among fabricators last month was to buy only against current needs which were well down from those of recent years. The decline in ship and railroad requirements was especially pronounced.

Pittsburgh—Sales to railroads may improve later this year, increasing shipments of light plates.

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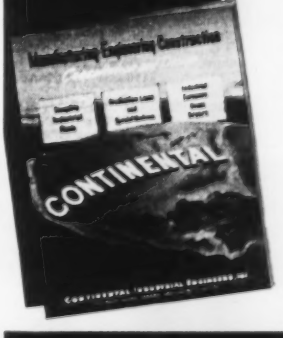

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ORES—COKE—REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$23.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$21.00-$22.00
48% no ratio	34.00

Domestic
(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill, $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

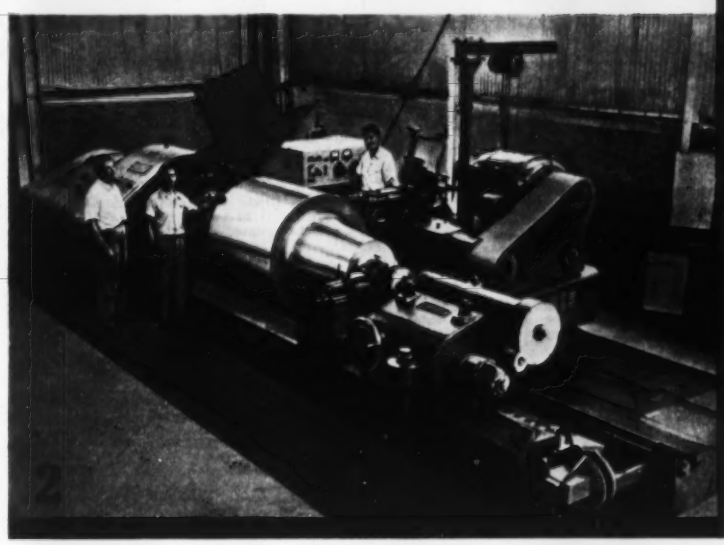
(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Diam. (Inches)	Length (Inches)	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55



FARREL® ROLL GRINDER shows its versatility in Mexican steel mill

The above machine is a Farrel heavy duty roll grinder, size 44″ x 14′0″. It has shown its ability to grind rolls of widely varying dimensions and materials to any desired finish.

The small roll being ground in illustration No. 1 is a 10″ diameter work roll for a four-high mill which gives the skin or finishing pass to the metal. The large roll in No. 2 is a 46″ diameter backup roll for a four-high hot mill. This is two inches greater in diameter than the rated capacity of the machine.

The machine is owned by the steel mill of Hojalata Y Lamina and is in use at their Monterrey, Mexico, plant, located about 100 miles south of the Texas border. They say, " . . . the roll grinder has been doing excellent work. We are very glad we purchased it."

Farrel roll grinders are able to cut roll grinding time substantially and, at the same time, produce rolls with a perfect surface free from marks of any kind. The automatic crowning device produces a mathematically accurate curve, symmetrical on both halves of the roll, for either a convex or concave shape, without manipulation by the operator.

For more of the advantages of Farrel roll grinders, write for descriptive bulletin.

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ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

FB-872

Farrel-Birmingham®

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.
(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85% C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 6-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.
(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6 per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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It may seem incredible, in this day and age, for any major machine tool to "buy" itself in nine short weeks of operation. But that's exactly what the Fastermatic Automatic Turret Lathe did on this job of machining clutch plate hubs.

Former time, on hand-operated turret lathes, was 15 minutes per piece. The Fastermatic, with automatic control of all machine functions, reduced the time to only 3 minutes, floor to floor.

Earnings piled up so fast over former production costs that the Fastermatic paid for itself in just 9 weeks—or 893 hours of operation.

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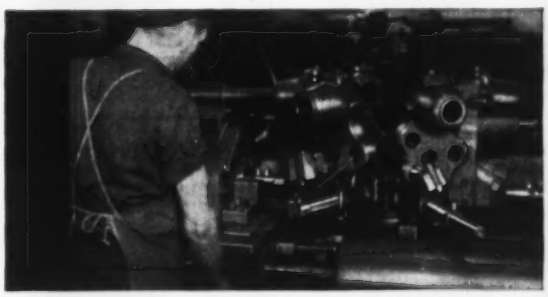

In this tooling setup, only 3 turret faces are needed to turn each part. With duplicate tooling on the remaining 3 faces of the hexagon turret, 2 parts are machined with each complete turret cycle. The operator merely loads and unloads the work.

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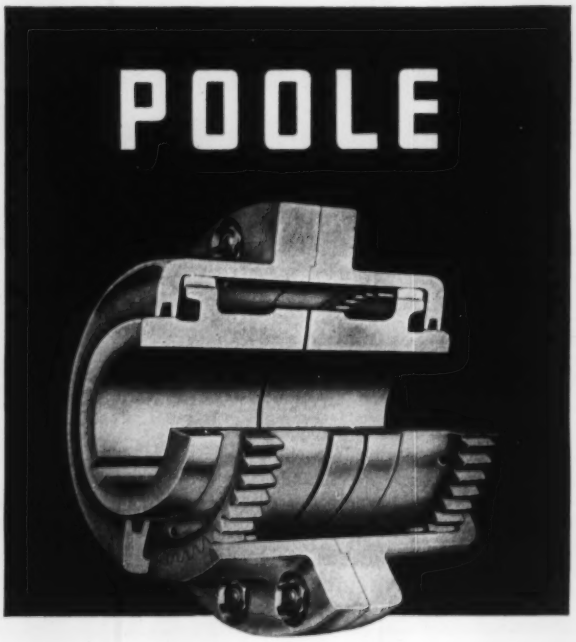

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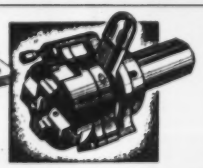

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Tubular Goods . . .

Tubular Goods Prices, Page 105

Boston — Merchant pipe distributors are not building up inventories, but in some cases are adding to original July orders due to sustained construction demand. Direct shipments are heavier for seamless than for buttweld. There is some deferment to fourth quarter against third quarter orders placed by utilities.

Bulk of buying for fuel storage and other installations at air bases is over the hill, including close to 1500 tons for Portsmouth, N. H.

Distributors' stocks of seamless are down. Most buttweld sizes can be filled from mill stocks. Pressure and mechanical tubing buying is slow.

Pittsburgh—Two Army shell contracts last week boosted the slim amount of defense business in the hands of tubemakers. Sales also received a push in the form of a flurry of strike-fear buying. Producers expect July vacations to cut into their June gains. Sales of seamless tube for oil country use continue strong. Improvement is developing in sales of buttweld.

Los Angeles—Large quantities of French, German and Belgian pipe are being offered for sale in this area.

San Francisco—California utilities will use about as much steel pipe this year as they did in 1953. There will be about a 10 to 15 per cent decline in use of large diameter pipe, but this will be offset by greater demand for smaller diameter transmission pipe.

Seattle—Cast iron pipe demand is fairly active, last week's awards totaling 600 tons. An equal tonnage is pending at various cities in Oregon and Washington where bids have been opened.

Wire . . .

Wire Prices, Page 104

Pittsburgh — Merchant wire sales are slowing down but gains continue in manufacturers wire. Shipments were higher in June than in May. It was the third successive month in which modest gains were made. Few fabricators built stocks in anticipation of a steel strike. Fastener makers, among others, have rounded stocks. A sales decline is expected this month as some fabricators close for vacations.

Boston—Wire mill order backlogs are small and consumer inventories are lower on numerous grades and sizes. For months buying has been for current requirements only. In most cases, burdensome inventories are near balance if mills continue able to make prompt shipments.

Rope wire continues in slow demand. More carbon wire is going into pre-stressed concrete structures, notably for bridges, an instance being 3000 tons required for bridges in New Orleans.

Cleveland—Wire order volume is described as fair though it is substantially under that entertained a year ago. Merchant products are seasonally active and demand for construction wire goods, such as road mesh, is reported exceptionally strong.

Vacation shutdowns at many consuming plants over the next few weeks, of course, will adversely affect manufacturers wire. Local plants of the American Steel & Wire Division, U. S. Steel Corp., in past years have suspended operations the first two weeks of July for mass vacations. This year, however, vacations will be staggered permitting uninterrupted production.

Pig Iron . . .

Pig Iron Prices, Page 106

Chicago—Pig iron sellers received a surge of orders immediately following the union's rejection of the U. S. Steel Corp.'s proffered wage contract. How much of this hedge tonnage will stick now that the union has accepted the corporation's second offer is uncertain. In any event, the orders stipulated June shipment, the implication being shipments for July would be reduced correspondingly.

This was one of the few instances of strike-hedge buying in evidence here in recent weeks.

Foundry closings for vacations started putting a dent in July iron demand before the Fourth holiday.

Boston — Third quarter pig iron prices, Everett furnace, are down 25 cents per ton to $61 furnace for No. 2 foundry, the usual differentials applying on malleable and basic.

A moderate basic iron stockpile has been built at Everett. The melt is down due to vacation suspensions, but a couple shops are more actively engaged than they were. One has a defense contract; another Massachusetts malleable shop is advertising for foundry labor.

New York—Pig iron shipments are at the lowest ebb since the steel strike during the summer of 1952.

Buffalo—Demand for merchant pig iron lacks strength. Market sentiment leans toward the bearish side. Ingot production is taking about 80 per cent of local iron output.

Philadelphia—Apart from a slight bulge in demand during mid-spring, merchant pig iron business in this area showed little variation in the first six months. At no time was activity at all comparable with that in the corresponding period of last year. The steel strike threat caused no improvement in demand late in June.

Seattle—Foundries report normal summer operations. Foreign pig iron is favored by buyers, as a rule being delivered here $10 a ton under the domestic market.

Quotes Tungsten Wire Lower

Bloomfield, N. J. — Tungsten wire and rod prices have been reduced by the Lamp Division, Westinghouse Electric Corp. New price bulletins dated June 2, supersede PSB-106.1 to PSB-111.2 inclusive, dated Jan. 2, 1954. The lower prices represent a substantial savings to buyers.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

770 tons, state bridge work, Cumberland county, Pa., through Hempt Bros., general contractors, to Phoenix Bridge Co., Phoenixville, Pa.

600 tons, Washington state fairgrounds grandstand, Puyallup, to Star Iron & Steel Co., Tacoma, Wash.

555 tons, 3-span and single plate girder bridges, expressway, Waterbury, Conn., to American Bridge Division, U.S. Steel Corp., Pittsburgh, through Mariani Construction Co. Inc., New Haven, Conn., general contractor. Previously reported as going to another fabricator.

500 tons, building, Sears, Roebuck & Co., Elmira, N. Y., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

500 tons, Elelson Air Base, Alaska, nose hangars, to Isaacson Iron Works, Seattle; S. S. Mullen, Inc., Seattle, general contractor, low $1,251,920 to U. S. Engineer.

400 tons, Washington Athletic Club addition, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Howard S. Wright & Co. Inc., Seattle, general contractor.

290 tons, Lansburgh service building, Washington, to Barber & Ross Co., that city.

170 tons, telephone building, Poughkeepsie, N. Y., to Clausen Iron Co., Albany, N. Y.

165 tons, freight station and office, Lehigh Valley railroad, Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons or more, K.T.N.T. radio station tower, Tacoma, Wash., to Star Iron & Steel Co., Seattle.

STRUCTURAL STEEL PENDING

14,800 tons, superstructure, Kingston-Rhinecliff bridge across the Hudson river, bids to be closed by the New York State Bridge Authority, July 26; 900 tons of reinforcing bars also will be required.

6900 tons, superstructure for a viaduct, part of the Newark Bay-Hudson county extension, New Jersey Turnpike Authority, New Brunswick, N. J.; Bethlehem Steel Co., Bethlehem, Pa., low, with a bid of $2,335,972.50, followed by bids from the American Bridge Division, U. S. Steel Corp., Pittsburgh, of $2,376,975, and the Phoenix Bridge Co., Phoenixville, Pa., of $2,445,035.

935 tons, state bridgework, Bucks county, Pa., C. J. Langenfelder, Baltimore, low on general contract.

700 tons (if steel frame design is adopted), Tacoma city hall; plans in preparation.

565 tons, Rumford Point bridge, Androscoggin river, Rumford, Me.; bids July 14, Augusta, Me.

450 tons, also 70 tons reinforcing, railroad relocation, bridge construction, The Dalles, Oregon, project, Columbia river; general contract to Lee Hoffman, Beaverton, Oreg., low $519,191 by U. S. Engineer.
310 tons, state bridge, Towson, Md., bids closed June 29.
185 tons, two 100-foot welded plate girders, bridge, and single span beam bridge, F. E. Everett turnpike, Nashua, N. H.; bids in July 1, Concord, N. H.
152 tons, state bridge work, Bergen county, New Jersey, bids closed by the Highway Department, Trenton, N. J., July 13.
150 tons, state bridge, Bergen county, New Jersey, bids July 13.
128 tons, guides and appurtenances, The Dalles dam, Oregon, project; bids to U. S. engineer, Portland, Oreg., Aug. 31.
124 tons, state bridge work, Mercer county, Pennsylvania, bids July 16.
100 tons or more, intake equipment, gate units, etc., The Dalles dam, Oregon; Premier Gear & Machine Works, Portland, Oreg., low, to U. S. Engineer, Portland.
100 tons, Cedar river bridge; plans in preparation by Renton, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

250 tons, by-pass and laterals, Columbia Basin project, to Bethlehem Pacific Coast Steel Corp., Seattle; Steel Constructors of Oregon, general contractors.
165 tons, water treatment plant, Ft. Richardson, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Paul Fackler, Anchorage, Alaska, general contractor for U. S. Engineer.
150 tons, addition to Washington Athletic Club, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Howard S. Wright & Co. Inc., Seattle, general contractor.
100 tons, substructure materials handling building, Boeing Airplane Co., Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Cawdrey & Vemo, Seattle.

REINFORCING BARS PENDING

15,000 tons, Lake Ponchartrain bridge and north-south approaches, Greater New Orleans expressway, prestressed concrete design; Brown & Root, Houston, Tex., low, general contract; alternate for structural steel called for approximately 50,000 tons.
3250 tons, navigation locks, overflow dam, The Dalles project, Oregon, Columbia river; bids to U. S. Engineer, Portland, Oreg., Aug. 31.
2950 tons, 3/16-inch, 10-foot lengths, Glidden, Ga.; bids July 6, Navy purchasing office, Washington.
165 tons, two state bridges, F. E. Everett turnpike, Nashua, N. H.; bids in July 1, Concord, N. H.
80 tons or more, military installation near Issaquah, Wash.; Henrik Valle Co., Seattle, low, to U. S. Engineer.
47 tons, 165-foot bridge, Lane county, Oregon; bids to Bureau of Public Roads, Portland, Oreg., June 30.

PLATES . . .

PLATES PENDING

370 tons, 24 steel vegetable oil storage tanks; bids to Port of Seattle, July 12.
50 tons or more, 75,000-gallon elevated steel tank; Pittsburgh-Des Moines Steel Co., Seattle, low, to 13th Naval District, Seattle.

PIPE . . .

CAST IRON PIPE PLACED

511 tons, 6 and 8-inch cast iron pipe, for Portland, Oreg., also 77 tons for Kent, Wash. to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

560 tons, 4 to 16 inch cast iron pipe, local improvement; Paine & Gallici Inc., and Milone & Tucci Inc., Tacoma, Wash., joint low to Tacoma, $138,290 for general contract, pipe award pending.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Babcock & Wilcox Co., one 50-ton diesel electric unit, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.
General American Transportation Corp., one 35-ton diesel-hydraulic locomotive unit, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.
Pittsburgh Plate Glass Co., one 80-ton diesel electric unit, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

RAILROAD CARS PLACED

Burlington, 100 seventy-ton covered hopper cars, to General American Transportation Corp., Chicago.
Chicago & Illinois Midland, 150 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.
Maine Central, 15 seventy-ton covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago.
Nickel Plate, one 250-ton flat car, to its own shops.
Reading, 50 seventy-ton flat cars, to own shops.
Rutland railway, 60 box cars, to Pullman-Standard Car Mfg. Co., Chicago.
Southern Pacific, 10 gallery-type suburban coaches, to the Pullman-Standard Car Mfg. Co., Chicago.
Wabash, 50 fifty-ton flat cars, to own shops.

RAILS PLACED

Alaska railroad, 58.7 miles, 115-lb., main line, 12,500 tons, to Bethlehem Steel Co.'s Steelton, Pa., mill.
Alaska railroad, 3000 tons of tie plates, to Bethlehem Pacific Coast Steel Corp., Seattle; also 625 tons angle bars and 85 tons spikes to same producer.

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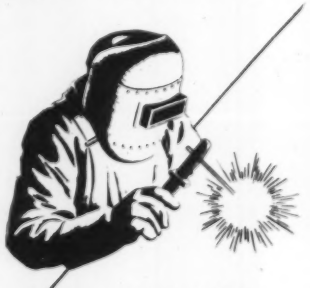

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Vacation Lull Slows Scrap Movement

Prices on steel and cast grades tend downward at some points with buying at virtual standstill. Steel wage settlement removes some uncertainty from market

Scrap Prices, Page 122

Chicago—Scrap buying has been at low ebb here, probably under influence of the labor contract negotiations. Some grades declined $1 to $2 per ton just prior to announcement of the wage settlement. Principally affected were some railroad items, dealer bundles, turnings and borings, and cast items. What effect the wage settlement will have on the market could not be immediately determined.

The decline in cast scrap prices reflected to considerable extent lessened demand since many foundries are closing this month for 2 to 3 weeks for vacations. Also, during the month steelmaking operations are expected to ease moderately, partly because of vacation schedules and partly because of a seasonal slackening in demand for finished steel.

Boston—Steel scrap prices have a weak tone with buying at a minimum. No. 2 steel prices, including bundles, are confused, doubt existing as to whether or not the last paid prices could be obtained today. Demand for the cast grades has slackened with No. 1 cupola and mixed cast slightly easier.

Philadelphia — Business in open-hearth scrap continues dull. The only change in the entire list of scrap grades, including cast material, is a $1 reduction on machine shop turnings to $14 delivered. Prices on electric furnace bundles and heavy turnings are purely nominal. Trade interests expect light trading over the next few weeks.

Buffalo—Scrap prices are steady here, aided by accord in the steel industry wage negotiations. No new business of consequence is reported locally but buying interest from Valley sources is providing some support to prices. Mass vacations are a factor in the present dull market situation. Dealers generally are marking time pending resumption of more active demand.

Pittsburgh — Prices remain unchanged, resisting any downward trends resulting from lower production rates this summer. Consumers have ordered little scrap lately. Prices are the same as determined by the last major purchase reported in early June.

Cleveland—Trading in scrap is at a virtual standstill here. Neither steel mills nor foundries are showing any interest and no business of consequence is expected by dealers and brokers this month with manufacturing operations curtailed because of mass vacations.

Reflecting the dull demand, open-hearth grades are quoted off another $1 per ton, in the absence of representative sales the current market being based on broker and dealer offers.

Settlement of the steel wage negotiations on the basis of a 10 to 12 cents per hour package increase removes some of the uncertainty that has prevailed recently in the scrap market. Some trade interests report the undertone definitely stronger than a week ago despite absence of buying and continued downtrend in prices currently.

Cincinnati—Open-hearth grades of

(*Please turn to page* 124)

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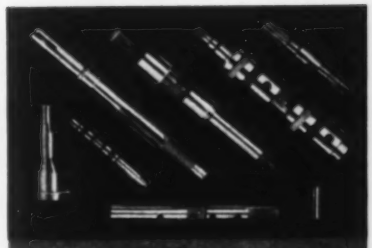

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 30	$27.83
June 23	27.83
May Avg.	**28.00**
June, 1953	40.50
June, 1949	20.85

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	29.00-30.00
No. 2 bundles	24.00-25.00
No. 1 busheling	29.00-30.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals	30.00-31.00
Heavy turnings	28.00-29.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	36-00.37.00
Charging box cast	33.00-34.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt	31.00-32.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*26.00-27.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	*25.00-26.00*
Cut structural plate 2 ft. and under	*32.00-33.00*
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	25.00-26.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	26.50-27.50
Stove plate	*34.00-35.00*
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.50-26.50
Brake shoes	*29.00-30.00*
Clean auto cast	42.00-43.00
No. 1 wheels	32.50-33.50
Burnt cast	*29.50-30.50*
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 2-ft. and under	*43.00-44.00*
Rails, 18 in. and under	*45.00-46.00*
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	42.50-43.50
Rails, rerolling	42.00-43.00

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*20.00-21.00*
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	30.00-31.00
Electric furnace bundles	*27.00-28.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	21.00
No. 1 bundles	24.00
No. 2 bundles	18.00-19.00
No. 1 busheling	23.00
Electric furnace bundles	25.00*
Machine shop turnings	*14.00*
Mixed borings, turnings	15.00
Short shovel turnings	17.00
Structurals & plate	26.00
Heavy turnings	22.00*
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	37.00
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	17.00-18.00
No. 2 heavy melting	15.00-15.25
No. 1 bundles	17.00-18.00
No. 2 bundles	12.25-13.25
Machine shop turnings	5.00-6.00
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	21.00-22.00
Short shovel turnings	7.50-8.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.00
No. 2 heavy melting	15.25-16.00
No. 1 bundles	17.00
No. 2 bundles	13.25-14.25
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	10.00-10.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	*26.00-27.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*26.00-27.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos., 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R., heavy melt.	29.00-30.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

CHICAGO

No. 1 heavy melting	30.00-32.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	32.00-33.00
No. 1 dealer bundles	*29.00-30.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	30.00-32.00
Machine shop turnings	*12.00-13.00*
Mixed borings, turnings	*12.00-13.00*
Short shovel turnings	*14.00-15.00*
Cast iron borings	*14.00-15.00*
Cut structurals, 3-ft.	*33.00-34.00*
Punchings & plate scrap	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	*35.00-37.00*
Stove plate	*31.00-33.00*
Unstripped motor blocks	24.00-25.00
Clean auto cast	*37.00-39.00*
Drop broken machinery	*37.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt	*32.00-33.00*
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	*43.00-44.00*
Rails, 18-in. and under	*44.00-45.00*
Angles, splice bars	*37.00-38.00*
Rails, rerolling	*42.00-43.00*

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*19.00*
No. 2 heavy melting	*17.00*
No. 1 bundles	*20.00*
No. 2 bundles	*15.00*
No. 1 busheling	*20.00*
Machine shop turnings	9.00
Mixed borings, turnings	*9.00*
Short shovel turnings	*9.50*
Punchings & plate scrap	*23.50*

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	24.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.00-27.00
No. 2 bundles	20.50-21.50
No. 1 busheling	26.00-27.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.50-18.00
Short shovel turnings	18.50-19.00
Cast iron borings	17.50-18.00
Low phos.	29.00-29.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural, plate 2 ft.	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	26.50
No. 2 heavy melting	24.50
No. 1 bundles	26.50
No. 2 bundles	20.25
Machine shop turnings	12.00
Short shovel turnings	14.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.50
Rails, 18-in. and under	41.00
Rails, random lengths	38.00
Rails, rerolling	44.00
Uncut tires	32.50
Angles, splice bars	33.50

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	*32.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	42.00-45.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	*20.00*
No. 2 bundles	*16.00*
Machine shop turnings	5.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Gradest

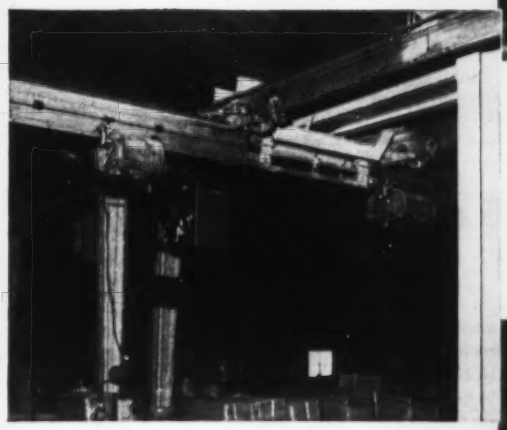
No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

AMERICAN MONORAIL CRANES

for smooth operation at low maintenance cost use.....

Three-ton hoist hook service extends from craneway to craneway by finger-tip controlled passage of carrier across crossover with cranes interlocked at each end.



One-ton hoist operated from crane bridge to crane bridge interlocked at crossover between craneways.

Three MonoRail cranes are interlocked to form passageway for transfer from receiving dock to steel storage area. Crane in foreground interlocks with spur track to each shear.

To handle variable loads over maximum areas, MonoRail Cranes offer smooth travel, easy movement, interlocking service between and beyond craneways, low initial cost and most important low maintenance cost. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.

Write for C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

Got a Perforating Problem?
See Hendrick For The Solution!

Sometimes the quickest, surest answer to design problems is very simple. In numerous cases, the inclusion of a pleasing pattern of perforations is just what is needed to make products more attractive and saleable. And whatever material you're using—be it metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes, Hendrick can help you.

For many years Hendrick has been building up the largest stock of dies commercially available. If you are faced with the need for bringing newer, more modern design elements into your products, Hendrick's long experience and perforating facilities can be yours for the asking. Write for more information, today.

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MANUFACTURING COMPANY
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Sales Offices in Principal Cities

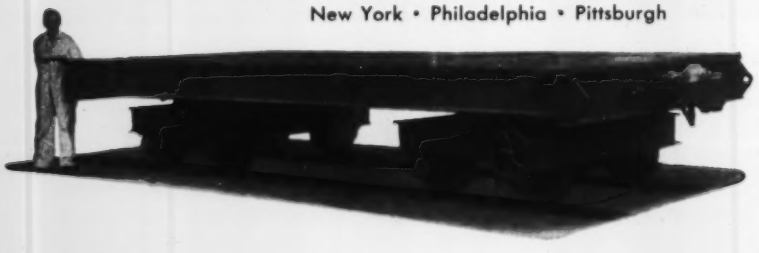
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

EASTON® A-1043

Platform Cars

Single and double-truck to any desired capacity

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.
New York • Philadelphia • Pittsburgh



(*Concluded from page* 121)

scrap have moved downward $1 a ton. The reduction is based on an appraisal of market conditions, not actual sales. There has been no new buying in this area but industrial lists in Michigan, northern Ohio and Indiana are off $1 to $3 a ton. Brokers and dealers mark time.

Los Angeles—Prices on No. 1 and No. 2 bundles advanced $2 to $20 and $16 respectively per gross ton. A change in local specifications now lists No. 2 bundles 3 feet and under instead of 5 feet.

San Francisco—No. 1 cupola cast has reached a new top range for the current move at $42 to $45 a ton, breathing a little life into an otherwise extremely sluggish scrap market. Open-hearth grades are piled high at mills. Brokers and generators are more or less marking time.

Seattle—While No. 1 and No. 2 heavy melting steel are nominally quoted at $23 and $19 respectively, a large Oregon interest is reported to have purchased considerable tonnage at $24.50 delivered for No. 1 and $21 for No. 2. Electric furnace No. 1 is quoted at about $32 while No. 1 cupola cast is steady at $30 to $35, breakable cast at $25.

Dealers have fair stocks of steel scrap on hand. Cast grades are in plentiful supply. In view of the potential strength of the market there is a disposition to hold back and wait. The Puget Sound Navy Yard is receiving quarterly bids for its scrap accumulation totaling 700 tons of prepared and 2000 tons of unprepared material.

Iron Ore . . .

Iron Ore Prices, Page 114

Cleveland—Substantial tonnage of lean ore will be moved from the Labrador mines to Seven Islands, Que., beginning this month to serve as a stockpile bedding at Seven Islands for the merchant ore which will be stored there. Movement of the lean ore provides the mine operators an opportunity to test railroad and other facilities that have been installed over past months.

Expectations are merchant ore will begin moving from Seven Islands soon. Whether first tonnage will move to Atlantic Coast ports, such as Baltimore and Philadelphia is uncertain. First shipments may be to Lake Erie ports. Prices quoted on the Labrador ore are the same as those on Lake Superior ores.

The Labrador mines are operated by the Iron Ore Co. of Canada which

CLASSIFIED ADVERTISING

Opportunities

STEEL FABRICATING PLANT, large N. E. Ohio city, established 1943 by owner, grossing $700,000 annually, big potential, 4 bldgs. with 24,000 ft. floor space, 3 acres land, light and heavy equipment, replacement value $210,000, making pressure vessels, tanks, miscellaneous products; R.R. siding; controlling interest for sale $200,000. APPLE COMPANY, BROKERS, 1836 Euclid Avenue, Cleveland, Ohio.

Help Wanted

SALES ENGINEER FOR POSITION OF MANAGER OF SALES, steel plate fabrication, experienced and progressive, 30 to 40 years. Well established company. Opportunity for aggressive man. Give complete particulars. Reply to: TIPPETT & WOOD, Phillipsburg, New Jersey.

QUALIFIED BLAST FURNACE SUPERINTENDENT or Assistant on single stack plant. Give experience, education and salary expected. Write in detail. Reply Box 978, STEEL, Penton Building, Cleveland 13, Ohio.

CONSTRUCTION GENERAL MANAGER — Wanted an experienced Construction Executive to assume full responsibility for management of a well-established building business serving the oil, chemical, power, steel and related industry. This applicant must be qualified to direct sales, engineering and heavy construction work. Reply giving personal history, education, experience and salary range. Reply Box 994, STEEL, Penton Building, Cleveland 13, Ohio.

FORGE COMPANY LOCATED MIDWEST, REQUIRES PLANT SUPERINTENDENT. MUST HAVE EXPERIENCE ALL PHASES FORGING OPERATIONS INCLUDING LARGE STEAM HAMMERS. PREVIOUS SUPERVISORY EXPERIENCE AND ADMINISTRATIVE ABILITY ESSENTIAL. GIVE HISTORY, AGE, SALARY DESIRED, ETC. ADDRESS BOX 983, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

TUBING SALESMAN

HERE IS A CAREER OPPORTUNITY FOR A THOROUGHLY EXPERIENCED TUBING MAN TO HEAD UP THE DEPARTMENT OF A WELL ESTABLISHED PHILADELPHIA WAREHOUSE. MILL OR WAREHOUSE BACKGROUND IN TUBING SALES A MUST. THIS IS THE CHANCE OF A LIFETIME FOR A REAL GOOD MAN. WRITE IN CONFIDENCE TO—G. J. EHNE, HILL-CHASE & CO., INC., TRENTON AVE. & ONTARIO ST., PHILADELPHIA 34, PA.

Positions Wanted

PLANT MANAGER—M.I.T. Engineering Graduate with Proven Record in Plant Supervision and Control, Qualified as Production Manager or Chief Industrial Engineer. Reply Box 992, STEEL, Penton Building, Cleveland 13, Ohio.

MASTER MECHANIC, B.S.M.E., Age 44, fifteen years supervisory capacity, twenty years experience. Present position with plant employing 1600 people. Reply Box 993, STEEL, Penton Building, Cleveland 13, Ohio.

WANT TO REPRESENT in Wisconsin Reputable Steel Warehouse. Five Years' Experience in Wisconsin. Can Guarantee Business. Salary and Expenses. College Education. Age 36. Reply Box 991, STEEL, Penton Building, Cleveland 13, Ohio.

PLANT SUPERINTENDENT—A college man in his early 40's thoroughly experienced in all Phases of Structural Fabrication including Cost and Engineering, desires similar position preferably in South or Southwest. Reply Box 986, STEEL, Penton Building, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 44 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

For Sale

FOR SALE—One Landis 12" x 72" Type C Universal Grinding Machine, heavy bed, complete with all necessary accessories, good as new and in perfect condition. Reply Box 990, STEEL, Penton Building, Cleveland 13, Ohio.

WANTED

#10RFRG Medart, or equivalent, Bar Turning Machine

#6 Medart 2 Roll Rotary Straightener

Both machines capable of handling round heat treated alloy steel bars from 3" to 10" in diameter inclusive, and from 30' to 40' in length.

Reply Box 984, STEEL
Penton Building Cleveland 13, Ohio

REPRESENTATION WANTED

MANUFACTURERS REPRESENTATIVES WANTED TO REPRESENT NATIONALLY KNOWN MANUFACTURER OF METAL FINISHING EQUIPMENT INCLUDING BONDERIZING EQUIPMENT, ELECTROSTATIC PAINT SPRAY EQUIPMENT, BAKE OVENS, ETC. EXCLUSIVE TERRITORIES AVAILABLE.

REPLY BOX 981, STEEL
PENTON BUILDING CLEVELAND 13, OHIO

ROLLING MILL ENGINEER

California Steel Mill has excellent opportunity for experienced rolling mill engineer. Position requires experience in design and operation of equipment for flat, tubular, shape, tin mill products. Please forward resume to BOX 988, STEEL, Penton Building, Cleveland 13, Ohio, giving complete personal history including age, education, experience and salary required. Replies confidential. Our staff knows of this advertisement.

STEEL PLANT DESIGNERS

If you have basic steel experience we have outstanding opportunities for you. Modern plant in So. Calif. which produces a wide variety of rolling mill products has openings for men with design experience in mechanical, structural and electrical fields. Please forward complete resume to BOX 989, STEEL, Penton Building, Cleveland 13, Ohio, giving personal history, age, education and salary required. Replies confidential. Our staff knows of this advertisement.

SUPERINTENDENT

by Pacific Northwest Plate Fabricating Plant

This firm has a Dun and Bradstreet AA-A1 rating, has been in business over 50 years, and occupies a well equipped and thoroughly modern plant, specializing in custom fabricating, and employs from 150 to 300 men.

Position offers permanence, the pay commensurate with responsibilities and qualifications. Right man should be expert in modern welding techniques and codes, and also have a full knowledge of shop practices and have proven ability to handle planning and supervision at this level. Should definitely want to live in the Pacific Northwest, with its year-around salmon fishing, boating and general living advantages.

Our organization has full knowledge of this ad; all communications from applicants will be treated in the strictest of confidence. In answering please give all detail possible, including age, education, experience, and all other items that may be helpful, and references if possible. Also some information as to remuneration receiving or expected.

In reply, address Box No. 987, STEEL
Penton Building Cleveland 13, Ohio

RAILWAY EQUIPMENT
FOR SALE
Used — As Is — Reconditioned
RAILWAY CARS—
ALL TYPES
"SERVICE-TESTED"
FREIGHT CAR REPAIR PARTS
For All Types of Cars
LOCOMOTIVES
Diesel, Steam, Gasoline
Diesel-Electric
RAILWAY TANK CARS
STORAGE TANKS
6,000—8,000 and 10,000-Gallon
Cleaned and Tested
CRANES
Overhead and Locomotive
RAILS
New or Relaying
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General Office
13462 S. Brainard Ave.
Chicago 33, Illinois
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"*ANYTHING* containing IRON or STEEL"

RELAY RAILS
AND ACCESSORIES
Largest Inventory on Pacific Coast
DULIEN STEEL PRODUCTS, INC.
OF WASHINGTON
P. O. Box 3386 Seattle 14, Wash.

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
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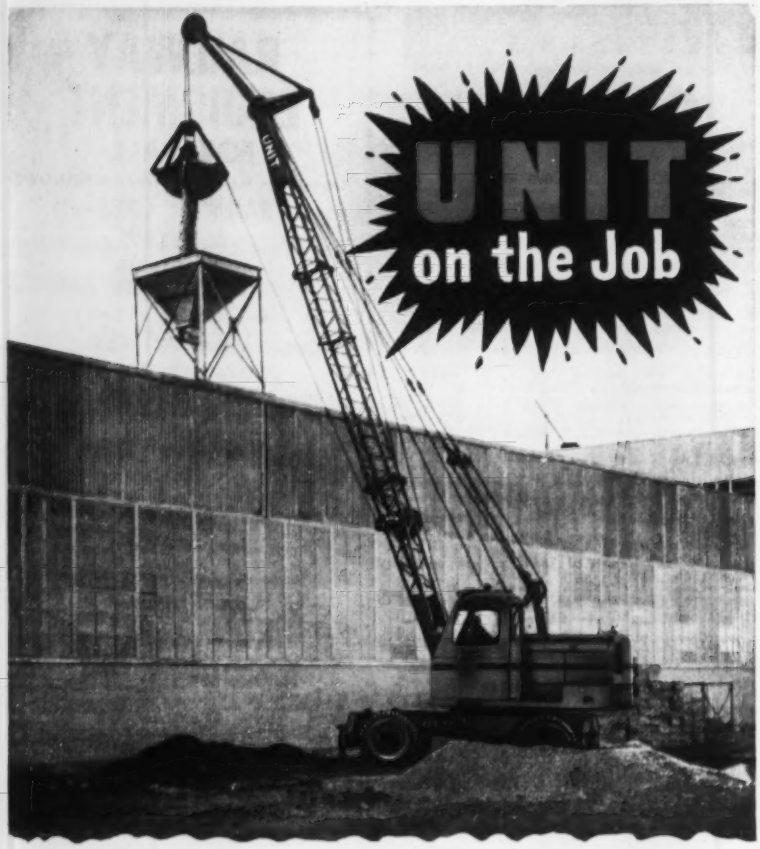
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

transformers
built to your specifications
Take advantage of our more than 40 years' experience in manufacturing and re-building industrial transformers. Complete satisfaction guaranteed.
Send us your specifications for prompt quotation
"TRANSFORMER HEADQUARTERS"
Manufactured - Bought - Sold - Repaired
THE ELECTRIC SERVICE CO., INC.
5315 Hetzel St., Cincinnati 27, Ohio



EASIER and FASTER! Unit 357 Mobile Crane Eliminates Stationary Elevators . . . Saves Man Hours on Factory Roofing Job.

Primarily this roofing job would require the erection of a scaffold-type elevator to hoist wheelbarrow loads of slag pebbles, plus a crew of men to load and unload the wheelbarrows. This means loss of setup time and duplication of handling. Now, with a UNIT 357, you drive up to the job — hoist the storage hopper to the roof — fill the hopper and the job is started. When insulation, roofing paper or other supplies are required, the UNIT 357 can move around the building to any location and hoist the material right on the spot where it's going to be used. Mr. Contractor, compare these two methods of material handling. Turn your lost time into PROFITS with UNIT.

Get the facts — Write for literature.

UNIT CRANE & SHOVEL CORPORATION
6521 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

All Models Convertible to ALL Attachments!

was formed originally by M. A. Hanna Co. of Cleveland and Hollinger Gold Mines Ltd. of Canada. There now are five American steel companies also financially interested in the project: Armco Steel Corp., National Steel Corp., Republic Steel Corp., Youngstown Sheet & Tube Co., and Wheeling Steel Corp.

Cleveland—Shipments of iron ore from the head of the lakes in the week ended June 28 totaled 2,413,378 gross tons, reports the Lake Superior Iron Ore Association. This was a slight decline compared with shipments of 2,471,698 tons in the preceding week, and is down sharply from the 3,318,438 tons moved in the corresponding week of last year.

Cumulative shipments to June 28 this year are reported at 21,065,472 gross tons, comparing with 34,913,247 tons to that date in the 1953 lake shipping season.

Washington—Production of iron ore in April amounted to 4,465,600 gross tons, reports the Bureua of Mines. This was up 43 per cent from March output, but was 55 per cent below that for April, 1953.

Similarly, shipments of 3,058,766 tons were 92 per cent above those for the preceding month.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 114

Chicago — Shipments of foundry coke are expected to be the lowest in July for any month this year. Since January, the slip-off has been progressive. Fuel is in plentiful supply. Consequently, the recent threat of a steel strike didn't stimulate any hedge buying. Reduced consumption this month probably was a factor too, with many foundries closing for mass vacations of 2 to 3 weeks.

Canada . . .

Toronto, Ont.—Production of pig iron in April amounted to 194,307 net tons against 200,763 in March and 241,583 in April, 1953. In the first four months this year output totaled 792,119 net tons, comparing with 949,943 in the like period last year.

Production of steel ingots and castings in April was 255,796 net tons, comparing with 249,290 in March, and 362,291 in April of last year. Production in the first four months this year was 1,070,897 net tons, including 1,037,639 tons of steel ingots and 33,258 tons of castings. This compares with a total of 1,401,976 net tons, including 1,364,753 tons of ingots and 37,223 tons of castings in the first four months of 1953.

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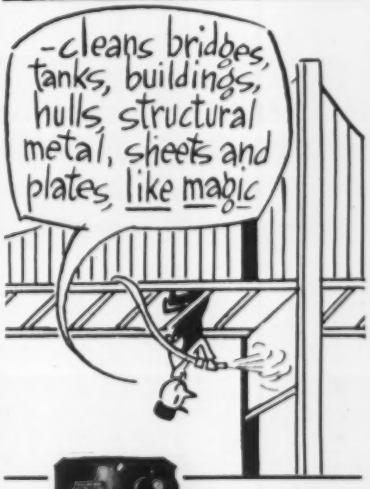
PANGBORN BLASTS
by don harold

COST-CUTTING STORY OF THE PANGBORN BLAST CLEANING MACHINE



Pangborn Blast Cleaning Machine —available in six types, stationary or portable— delivers efficient, low-cost maintenance in any plant. $188 up.

For details, write: PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Maryland.

Pangborn

BLAST CLEANS CHEAPER
with the right equipment for every job

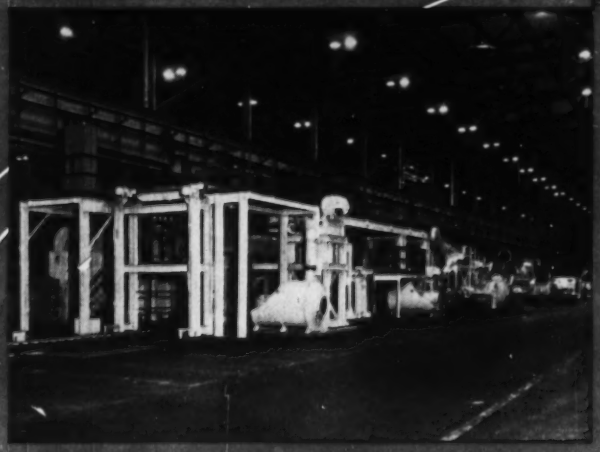
50th Anniversary Medallion

DO SMALL PARTS
LOOM LARGE
in your product's performance?
If the performance of your products depends on the concentricity of a small pin...on the perfection of a pivot or roller or other small precision part, let Torrington make those parts for you.
As a leading contract fabricator we produce over 10 million pieces a day to customers' specifications of tolerance, finish, temper and hardness—for less than you can make them yourself. Why not get our quotation?
More details in our Condensed Catalog—write for your copy today. And don't forget to send a sample part or blueprint for our quotation. It can save you time and money.
THE TORRINGTON COMPANY
Specialties Division
416 Field Street, Torrington, Conn.
TORRINGTON SPECIAL METAL PARTS
Makers of Torrington Needle Bearings

Aetna-Standard designers and builders of production machinery

Flat Rolled Equipment

AT FAIRLESS WORKS...



● In flat rolled finishing equipment, Aetna-Standard engineered and built the following equipment:

80" Sheet Side Trimming, Slitting and Recoiling.
80" Sheet Side Trimming and Shearing.
56" Wide Side Trimming and Shearing.
Sheet Stretcher Leveller.

For the Tin Mill Division, Aetna furnished a complete Hot Dip Tinning House with all auxiliaries; a side trimming and shearing line; a side trimming and recoiling line; and the classifying equipment for the electrolytic tinning line.

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPANIES

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Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and South America.
Societe de Constructions de Montbard, Paris, France — France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kullgren, Inc., Akron, Ohio — Representative for the Rubber Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries

Why Allegheny Ludlum's improvement program features 130 TIMKEN® roll neck bearings

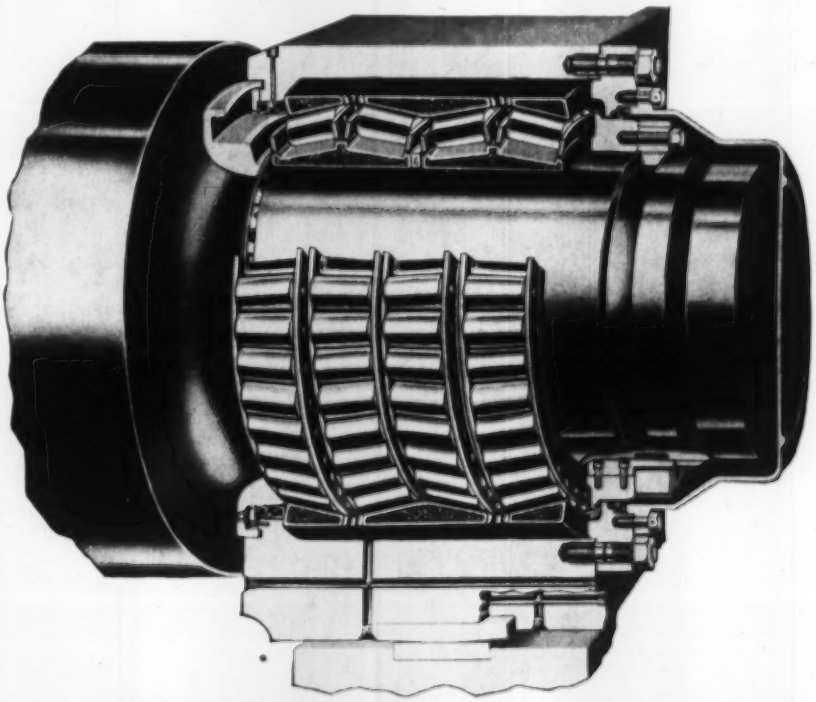
DOLLAR for dollar, Timken® roll neck bearings can't be beat—and mill records prove it. Actual cost figures show Timken bearing equipped mills operate at minimum bearing cost per ton of steel rolled! Allegheny Ludlum Steel Corporation has put 130 new Timken roll neck bearings on mills in the Brackenridge and Leechburg plants. It's part of their extensive program of improvements.

Timken bearings eliminate complicated lubrication systems, make roll changing easier and faster. Maintenance and repair time is cut.

The tapered design of Timken bearings lets them take both radial and thrust loads in any combination so that special thrust units are not required. And Timken bearings can take the heaviest mill loads. Line contact between rollers and races gives Timken bearings extra load-carrying capacity.

Mills accelerate more rapidly with Timken bearings because they lower starting resistance, reduce skidding and scuffing between work rolls and back up rolls. Over 50 years of bearing research and development have made Timken bearings first choice throughout industry. For more information about Timken roller bearing applications, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO."

This symbol on a product means its bearings are the best.



ALLEGHENY LUDLUM STEEL CORPORATION *mounts work and back up rolls on Timken tapered roller bearings to get less friction, longer life. Typical Timken roll neck bearing application is shown in cutaway.*

IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

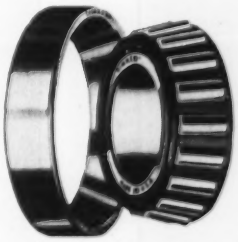
$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ◯ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION